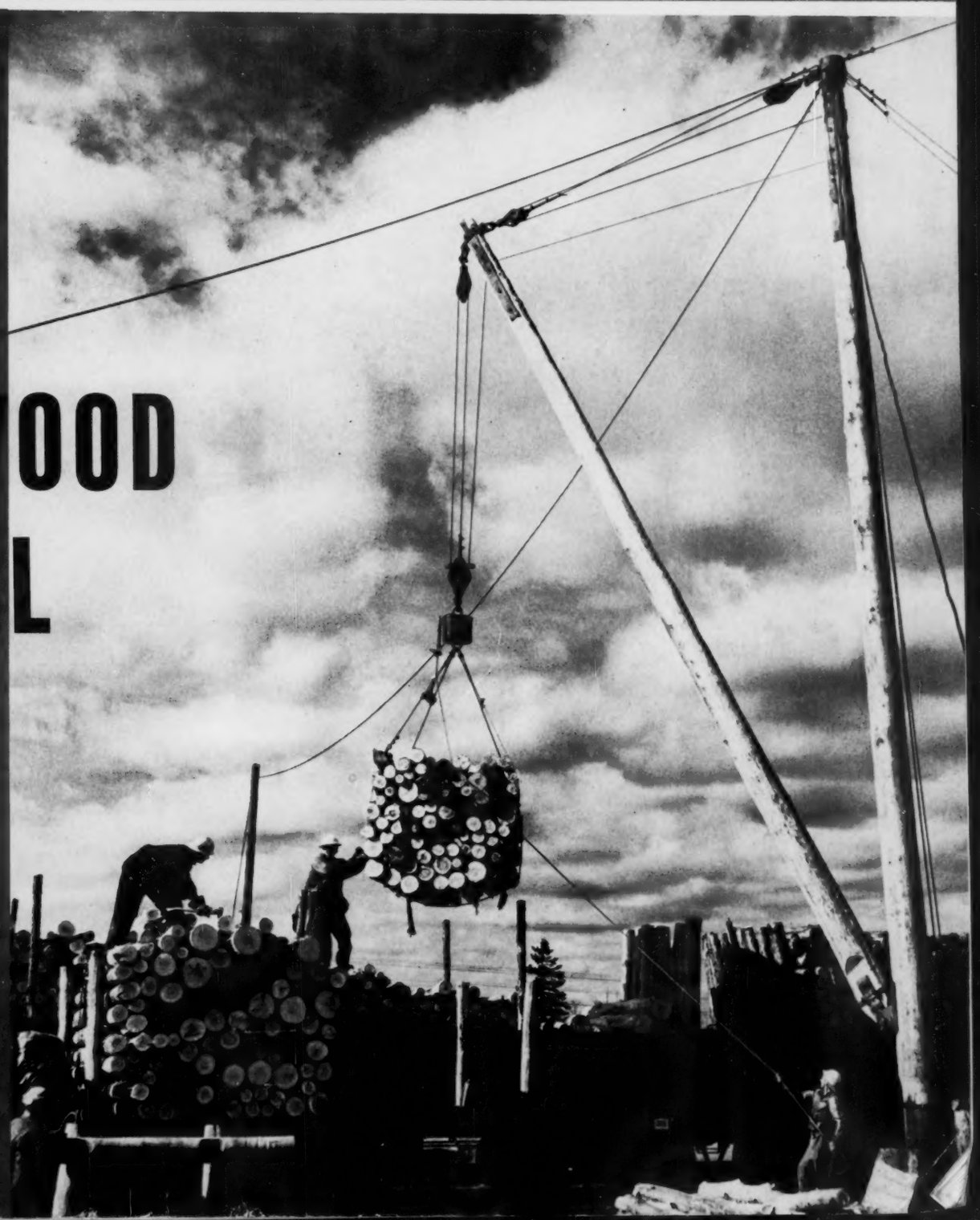
PULP & PAPER

MAY 1959

1959 PULPWOOD ANNUAL

begins on page 107



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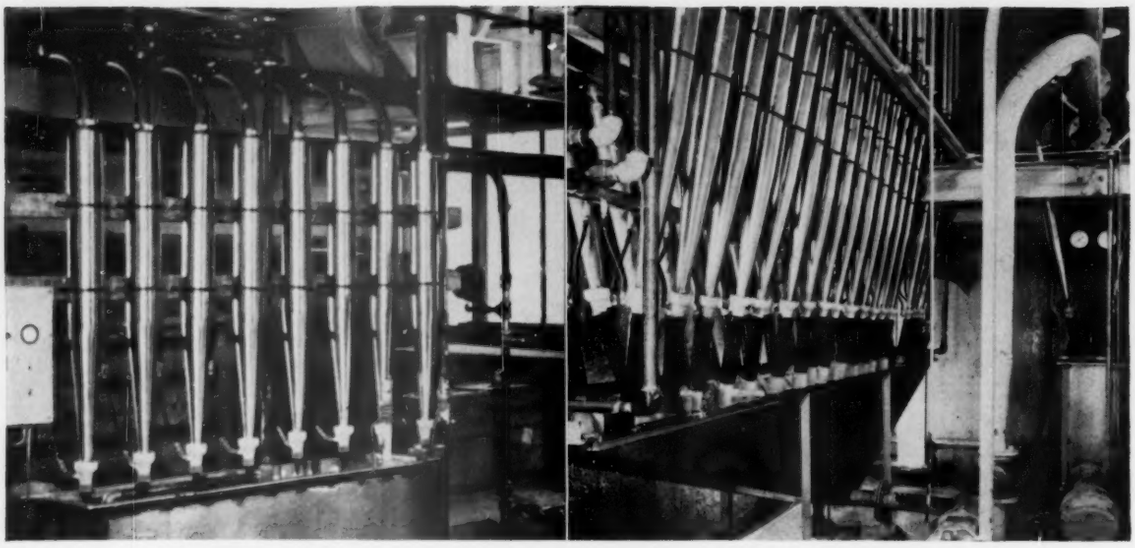
BOLTON EMERSON
TRADE MARK



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report

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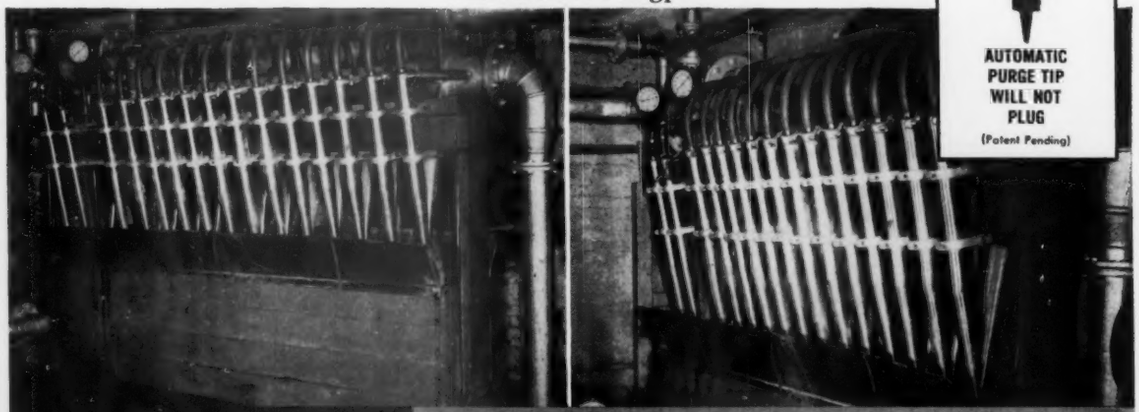

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Canadian Manufacturers of Bird Machinery
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PULP & PAPER

Reader's Guided Tour

VOLUME 33
NUMBER 5

The Common Market Challenge 49

. . . can have many implications for the U.S. pulp and paper industry. While new markets for the American industry are certain to develop, the European Common Market plan may have a reverse effect: European papers might become more competitive on this side of the Atlantic.

Latest Type Machine Drive 53

. . . in operation at Southland Paper Mills Inc. is designed to reduce maintenance, provide faster response and produce the ultimate in accuracy. Big feature of the mill's new No. 4 machine, the drive is one of the first of its type installed on any machine anywhere.

IP Corinth's New On-Machine Coater 56

. . . for publication grades marks complete change to machine coating production at this mill. Of special interest are the automatic stock preparation system, Twinver press, Consolidated roll coater and automatic roll handling system.

Important New Process for Sulfite Mills 61

. . . The Magnefite pulping process, which has caught the attention of sulfite mills all over the world, has undergone mill runs which prove that, in combination with the magnesia base recovery system (already in use in several mills), it will have many advantages. This is a special new report written for this magazine.

1959 PULPWOOD ANNUAL

60 pages—commencing on page 107

Once again, in this issue, PULP & PAPER presents the complete papers of the annual meeting of the American Pulpwood Association. Topics include the impact of recreation on private woodlands, utilization, wood quality evaluation, improving small woodlands, and a look at the idea woodyard.

CIRCULATION DEPT., 500 Howard St., San Francisco 5, Calif. C. C. Banke, Circ. Mgr. Send subscription orders and changes of address to PULP & PAPER, above address. Include both old and new addresses.

RATES (including World Review Number): U.S., Canada and Latin America—1 yr., $5; 2 yrs., $8; 3 yrs., $10. Other countries—1 yr., $7. Sterling area orders may be sent to: Harold P. deLooze Ltd., 7 St. James Square, Manchester 2, England.

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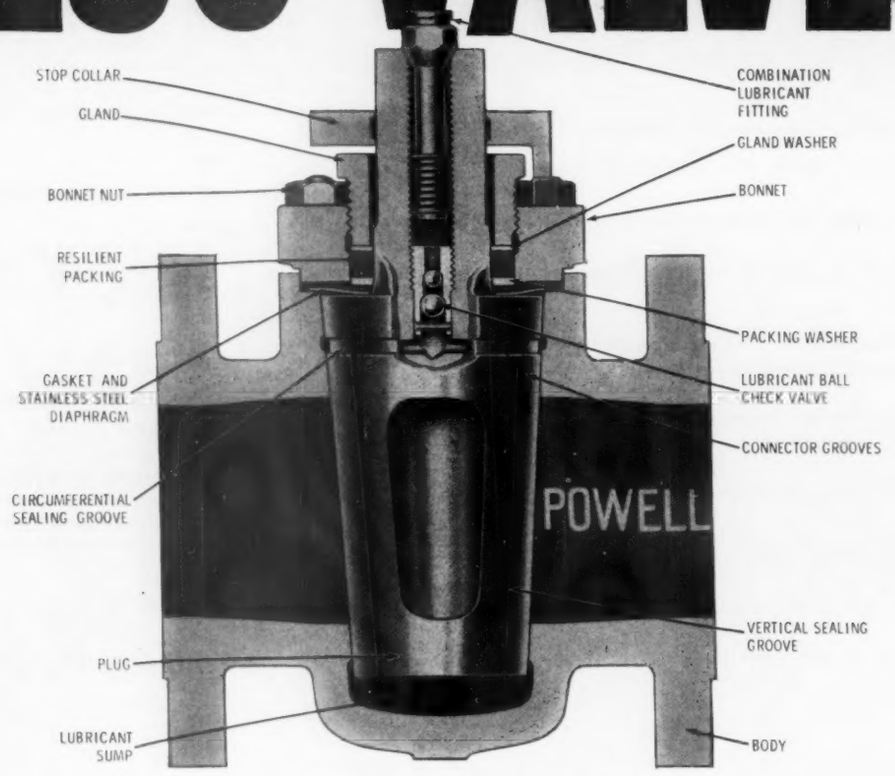
POWELL

LUBRICATED PLUG VALVES



Sectional view Powell Screwed Gland Lubricated Plug Valve.

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MILLER FREEMAN PUBLICATIONS

The Editor Reads His Mail

Address letters to The Editor, PULP & PAPER, 1791 Howard St., Chicago 26, Ill.

Too Many Trees in Maine

Editor: In regard to your article on the Northeast in the World Review, 1958, here is some interesting information for your readers:

There are approximately 21,000,000 acres in Maine. Approximately 17,000,000 acres are forested. Half of this is in central and southern Maine in the organized towns and accessible (on the whole). The other half is in central and northern Maine in the unorganized towns and the vast majority is only accessible when the individual timberland owners build access roads themselves.

The Forest Commissioner's office collects figures annually on the sawlog and pulpwood cut by counties, etc. From this it is apparent that two-thirds of the annual cut in Maine comes from the organized towns and only one-third from the unorganized towns.

A common expression amongst foresters in northern Maine is that at least twice as much timber falls down from old age, disease and insects damage as is cut. Why? Because of the economics of the situation.

We do have a major problem about stand density—simply and bluntly—too darn many trees per acre. To some extent this is obvious from paved roads and apparent while traversing logging roads and almost painfully true while walking through the woods.

The South is also plagued with a problem of stand density—just the opposite of ours—not enough trees per acre.

Another point. I have not seen the recently completed survey Forest Survey of Maine. But the data of the first 307 plots out of 1,000 to be analyzed (five year measurements), supports my view that Maine will have more growth per acre per year for all species on all forested land than New Hampshire or North Carolina. This, if true, will make Maine the undisputed leader of the entire U.S.

Now if this isn't worth big headlines, then I'm no judge of news.

Name withheld upon request.

(Editor's Note: The writer is a professor of forestry. He certainly makes some strong points about the growth rate in Maine vs. the South. Do we hear any challenges from the South?)

Liked Sonoco Story

Hartsville, S.C.

Editor: We were very pleased with the writeup on our new No. 10 Machine project and appreciate the detailed coverage and particularly the slant of the article.

C. W. COKER
Executive Vice Pres.,
Sonoco Products Co.

MEETING DATES CALENDAR

May 14
Michigan Div., APPMSA
Hotel Harris, Kalamazoo, Mich.

May 21-23
Pacific Coast Div., APPMSA, and Pacific Coast Section, TAPPI, Multiple Water Use Seminar
Gearhart Hotel, Gearhart, Ore.

May 22
Connecticut Valley Div., APPMSA
Strathmore Park, Woronoco, Mass.

May 25-27
American Society for Quality Control, Annual Convention and All-Industry Production & Quality Control Exposition
Public Hall, Cleveland, O.

May 25-27
TAPPI Coating Conference
Hotel Statler, Boston, Mass.

June 2-4
APPMSA National Meeting
Shamrock-Hilton Hotel, Houston, Texas

June 12
Miami Valley Div., APPMSA
Piqua Country Club, Piqua, O.

June 15-26
Summer Course: "Paper its Properties and Uses" (sponsored by the Boston Paper Trade Assn. and the New England Paper Merchants Assn.)
Lowell Technological Institute, Dept. of Paper Engineering.

June 28-July 3
Forest Products Research Society, 13th National Meeting—"Research for Profit"
St. Francis Hotel, San Francisco, Cal.

August 17-21
10th TAPPI Testing Conference
Multnomah Hotel, Portland, Ore.

September 10-12
Wood Industries Conference (sponsored by the American Society of Mechanical Engineers, the Forest Products Research Society and the American Institute of Chemical Engineers)
Multnomah Hotel, Portland, Ore.

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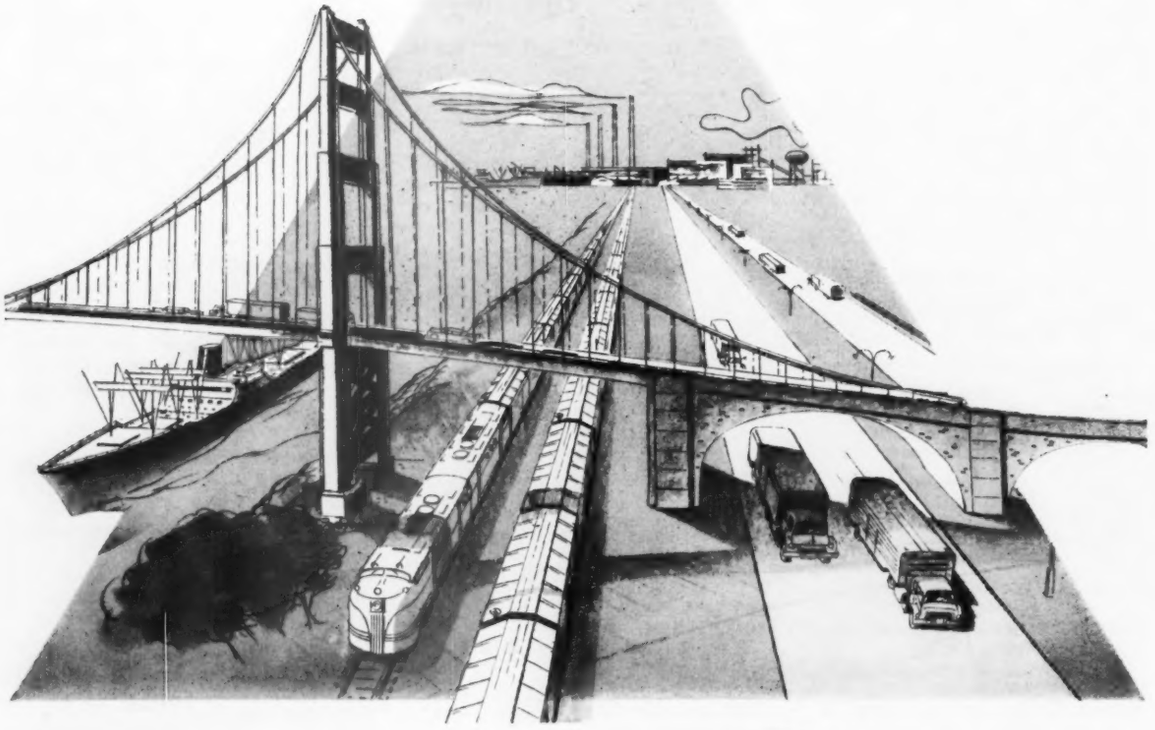

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MONTHLY REPORT – WORLD NEWS

TWO GERMAN MACHINERY BUILDERS . . . are cooperating in construction of an Egyptian pulp and paper mill. Krauss-Maffei-Imperial GmbH. & Co. (Munich) will build the pulp plant, while Escher Wyss GmbH. (Ravensburg/Wurt) has contracted for the paper mill.

KELLOGG BUILDING TENNESSEE MILL. . . . Construction has started on Tennessee River Pulp & Paper Co.'s new plant at Counce, Tenn., U. S. A. Gunnar Nicholson, president, reports award of a $30,000,000 contract to M. W. Kellogg Co., New York, N. Y., for the 500-ton kraft pulp and board liner plant. Assisting in design is H. A. Simons Ltd., Vancouver, B. C., Canada. Operation set for early 1951.

A NEW BELGIAN CORPORATION . . . will serve a substantial part of the European Common Market with household tissue products. The firm—Bowater-Scott Continental S. A.—was established jointly by Bowater-Scott Corp. Ltd. (English affiliate of Scott Paper Co., U. S. A.) and Papeteries de Belgique of Brussels. The new company will convert paper stock supplied by Bowater-Scott into finished products and distribute them in Holland, Belgium, Luxembourg and the northern parts of France and West Germany.

A NEW COATING PROCESS . . . will be unveiled at the TAPPI Coating Conference in Boston, U. S. A., May 25-27. It is a blade coater developed by John B. Kohler of Woodstock, Ill. In the Kohler method the underside of the web is coated as it passes in contact with the "coat" in a tank. A blade wipes excess coating color off. Interesting feature: an air knife device on the top side of the web to hold it in uniform contact against the blade. An experimental unit is in successful operation at a Canadian mill.

SOUTH CENTRAL AFRICA'S LARGEST MACHINE . . . for the production of corrugated cardboard containers recently went on the line at the Salisbury, So. Rhodesia plant of Amalgamated Packaging Industries (Rhodesia) Ltd.

PILOT PULP MILL IN FLORIDA, U. S. A. . . . The Pulp & Paper Laboratory at the Univ. of Florida's College of Engineering plans the construction of a pilot plant for the study of continuous pulping. The $60,000 installation is to have a 3-ton dry pulp capacity and is set for operation by the end of the year.

A NEW SWEDISH SULFATE MILL . . . will be built on Lake Malar west of Stockholm by Billeruds AB. The plant will have an annual capacity of 70,000 to 90,000 metric tons (77,000 to 99,000 short tons) of kraft pulp. About half of the wood needs will come from conifer and deciduous thinnings and sawmill refuse.

EXPANSION EXPENDITURES UP. . . . Based on recent reports, the U. S. A. paper and allied products industries will increase spending for new plants and equipment during 1959. Total spending this year, according to the U. S. Dept. of Commerce, will be about $608,000,000, about 5% over 1958, but still sharply below the 1957 level of $811,000,000.

FINNISH PAPER EXPORTS UP . . . during 1958, in spite of the general recession on the world market. The figure for 1958 was 972,454 metric tons (1,069,000 short tons), as compared with 949,424 metric (1,044,000 short) in 1957.

AUSTRIAN PRODUCTION DOWN . . . during the first nine months of 1958 to 319,000 metric tons (350,000 short tons). In the same 1957 period the figure was 327,000 metric (360,000 short). Chemical pulp production in the same period was 320,100 metric (352,000 short) and mechanical pulp output 113,400 metric (125,000 short).

SWEDISH FIRMS POOL RESEARCH RESOURCES. . . . Swedish Cellulose Co. and Billeruds AB will collaborate on research and development in the cellulose field. The program is aimed primarily at studies of viscose pulp but will cover other kinds of cellulose.

A log jam every minute dumped on rubber

B. F. Goodrich improvements in rubber brought extra savings

Problem: Those logs are on their way to being paper. After the bark is removed, the logs are dumped on a moving rubber belt—edgewise, endwise, flat, anyway they happen to tumble from the debarking drum. Keeping this wood on the move used to be quite a problem in paper mills. The huge logs hit the conveyor belt with such force that the rubber would be cut, the fabric weakened. Before long belts were torn to shreds.

What was done: Then engineers at the plant shown here decided to try the *cord* conveyor belt, designed by B.F. Goodrich to stand crashing impact. This belt is made with hundreds of cords, running lengthwise, buried in the rubber. These cords, which are strengthened and stabilized by a special B.F.Goodrich treatment, stand blows that would ruin ordinary fabric, yet they stay flexible. On many really tough jobs, B.F.Goodrich cord belts outlast ordinary rubber belts many times over.

Savings: The cord belt was put to work here 4 years ago. It stood the banging, crashing better than any belt used before. It lasted longer, carried more logs. Paper company officials were so pleased with this performance, they again chose a B.F.Goodrich cord belt when the first belt finally had to be replaced.

Where to buy: Your B.F.Goodrich distributor has exact specifications for the conveyor belt described here. And, as a factory-trained specialist in rubber products, he *can* answer your questions about *all* the rubber products B.F.Goodrich makes for industry. *B.F.Goodrich Industrial Products Company, Dept. M-580, Akron 18, Ohio.*

B.F.Goodrich *industrial rubber products*

MONTHLY REPORT – WORLD NEWS

LILY CUPS AND CONTAINERS IN ENGLAND . . . where an all-British firm, Lily Cups & Containers (England) Ltd., has established an "automatic plant" said to be "the most advanced of its type in Europe." The Liverpool operation turns out millions of cups and containers each month.

OVERSEAS CAPITAL IS REPORTED BEHIND . . . a move to revive a pulp mill project near St. John, N. B., Canada. Name of the proposed firm is Rothesay Paper Corp., and application has been made to the provincial government for incorporation. Said to be one of the groups supporting the venture is Sogemines Ltd., a Belgian-financed company with extensive holdings in Canada. Also mentioned: Sir Robert McAlpine and British associates. The goal is a $40,000,000 mill with a daily capacity of 300 tons. . . . According to a report to PULP & PAPER, some opposition has developed as a result of concessions made to Rothesay by the provincial government.

CHILEAN FIRM SEEKS GOVERNMENT FUNDS. . . . Celulosa Chile S. A. is asking a $14,-500,000 government guarantee for its proposed cellulose and paper plant near Concepcion. The firm has already invested nearly $9,500,000 in location expenses.

SVENSKA CELLULOSA AB . . . will build a plant at Munksund, Sweden, for the annual production of 100,000 metric tons (110,000 short tons) of kraft linerboard. Also included in the firm's 1959 plans is doubling the capacity of the bleach plant of the Ostrand kraft pulp mill near Sundsvall.

HIGH-SPEED ON-MACHINE COATING RESEARCH . . . is being undertaken by St. Regis Paper Co., U. S. A., for printing papers and bleached container board. On-machine coating has been adopted for bleached kraft board at Pensacola, Fla.; experimental work is continuing at Deferiet, N. Y.

DOMINICAN REPUBLIC'S FIRST PAPER . . . is being manufactured by Industrial Nacional del Papel. Production at the new mill began in October, with output consisting of kraft and sulfite papers. It is planned to eventually produce newsprint and cartons. Providing machinery and technical advice was J. M. Voith GmbH. of Heiderheim/Brenz, Germany

EUROPE'S MOST MODERN YANKEE MACHINE . . . will be installed by Katrinefors AB, manufacturer of pulp, paper and board at mills in the south of Sweden. The machine —now on order—will be manufactured by AB Karlstads Kekaniska Werkstad, Karlstad. It will have a trim width of 3,350 mm. (132 in.) and a maximum speed of 750 mpm (2,460 fpm). Diameter of the cylinder will be 5,000 mm. (16 ft. 5 in.). Installation is set for completion in July 1960.

EUROPE'S FIRST GLIMPSE OF "CLUPAK" . . . will result from the signing of a license agreement between Clupak Inc., New York, N. Y., U. S. A., and Dynas AB of Sweden. The stretchable paper will be manufactured by Dynas on a new 250-in. kraft machine at its Vaja mill.

SUPERMARKET GROWTH UPS NEWSPAPER LINEAGE. . . . According to the Newsprint Information Committee, New York, N. Y., U. S. A., North American newspapers stand to gain at least $25,000,000 in new business from supermarket growth during 1959. In addition to supermarket expansion, a combination of marketing trends will contribute to an expected increase in advertising lineage requiring 20,000 more tons of newsprint during the year.

WORLD HEADLINES. . . . INTERNATIONAL PAPER Co., U. S. A., has joined with local interests in the formation of a new Venezuelan corporation — Envases International S. A.—that will produce Pure-Pak paper milk containers. . . . St. Regis Paper Co., U. S. A., has purchased a 20% interest in Companhia Industrias Brasileiras Portela S. A. which operates a paper and board mill in Jaboatao, Brazil. . . . West Virginia Pulp & Paper Co., U. S. A., has opened sales offices in London, England, and Havana, Cuba.

Which of these 3 products and services can you use from BECCO?

New Cold-Caustic Bleach Process

Looking for a way to use greater amounts of low-cost, more plentiful pulp—without capital investment for bleach equipment? Then let a Becco Sales Engineer show you our new technique* which allows you to bleach in the same equipment regularly used for the manufacture of cold caustic pulp.

In this new process, peroxide bleach liquor is added at the Bauer Refiner, and bleaching occurs during the refining operation. Bleach response depends on refiner densities.

Up to 20 points brightness increase has been obtained in commercial operations to date, and with no additional steam costs, no holding time, and no excessive chemical costs.

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No. 47 — Peroxide Bleaching of Pulps.

No. 48 — High-Density Pulp Bleaching.

No. 64 — Development Studies on Last-Stage H_2O_2 Bleaching of Alkaline Pulps.

No. 65 — Peroxide Bleaching of Southern Pulps.

No. 66 — Becco Laboratory Procedures for Pulp Bleaching, 1955 Ed.

No. 91 — Peroxide Bleaching of Chemi-Mechanical Hardwood Pulps.

No. 92 — Peroxide Bleaching of Chemical Pulps.

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Can you use this free Becco help, based on more years of experience with bulk handling of H_2O_2 than any other manufacturer? Use the coupon to let us know.

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Dept. PP-B

Gentlemen:
Please tell me more about your Four-Fold Engineering Service.

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FIRM_____

ADDRESS_____

CITY_____

ZONE____ STATE_____

MONTHLY REPORT – WORLD NEWS

$35,500,000 IN NEW FACILITIES . . . is the total invested by Crown Zellerbach Canada Ltd. in British Columbia since 1955. Manufacturing capacity has been increased by 75%.

HAWAII: AN EVER-INCREASING MARKET. . . . Barring another world war, the 50th United State will be another California as one of the great regional markets. . . . And as a producer: Crown Zellerbach Corp. and the Hawaiian sugar planters are researching the realm of bagasse pulp and paper. This may be soon outmoded: The State of Washington welcomed the new state with a gift of 50 Douglas fir seedlings. Pine does well in the Islands. Perhaps Douglas fir will also thrive. If that be the case, research perhaps should be directed at a combination of bagasse and/or pine or Douglas fir.

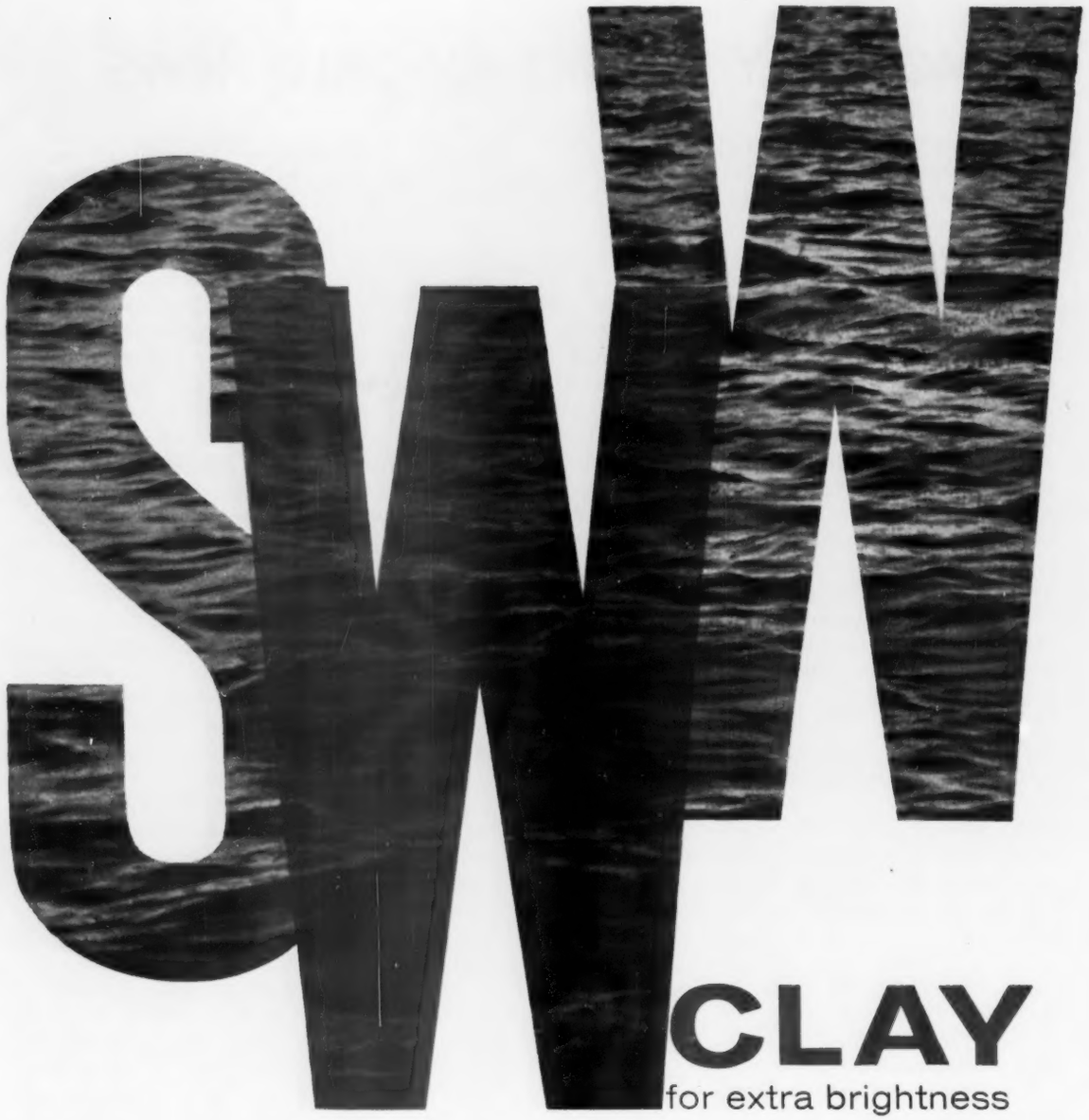
U. S. A. NEWSPRINT PRODUCTION UP. . . . According to the Newsprint Service Bureau, New York, N. Y., U. S. A., February newsprint production stood at 149,566 short tons (165,000 metric). This is considerably above the 140,361 short tons (154,000 metric) produced in the same month last year.

U. S. A. TREE PLANTING DOUBLED . . . during the past five years, according to the U. S. Dept. of Agriculture. In fiscal 1958 planting hit an all-time high of 1,568,708 acres. About 86% was on privately-owned land.

CZ ABANDONS NEWFOUNDLAND PLANS. . . . Economic factors revealed by recent studies have caused abandonment–at least for the present—of Crown Zellerbach Corp.'s plans to establish pulp and/or paper mills in Newfoundland, Canada. "We have concluded," a CZ spokesman said recently, "that the operations we would undertake carry costs that—with today's selling prices for newsprint–make it impossible to invest the capital required for a newsprint mill. It is also clear that economic factors rule out the investment required for a kraft mill based on Labrador wood."

CROSSETT PAPER MILLS EXPANSION . . . at Crossett, Ark., will cost about $800,000 in 1959. Aim will be installation of new equipment to improve kraft paper quality. Included: additional pulp screening and refining equipment, a new type paper dryer utilizing high-velocity air and facilities for handling wood chips purchased from sawmills. Engineering is by Rust Engineering Co., Birmingham, Ala.

HOPSCOTCHING THE NORTH AMERICAN INDUSTRY. . . . Simpson Paper Co., Everett, Wash., has opened a 25,000-sq. ft. one-story converting plant for the production of ruled reams, fillers, tablets, etc.; cost was approximately $250,000. . . . Union Bag-Camp Paper Corp. has acquired a controlling interest in Highland Container Co., Jamestown, N. C., through an exchange of stock. . . . Puget Sound Pulp & Timber Co., Bellingham, Wash., has established a Lignin Products dept.; the move follows the recent start-up of a 50-ton per day Bowen spray dryer. . . . Powell River Co. Ltd.'s sulfite pulp mill at Powell River, B. C., Canada, is being converted to a high-yield process operation; through reduced wood requirements, it is believed that substantial savings in the cost of newsprint manufacture will result. . . . Crossett Co., Crossett, Ark., has purchased all assets of Triangle Paper Bag Mfg. Co., Covington, Ky.; Crossett is Triangle's principal supplier of unbleached kraft paper. . . . St. Regis Paper Co.'s Ajax Box div. has announced construction of a $1,000,000 corrugated box plant at Bridgeview, Ill., near Chicago; completion is set for October 1. . . . Consolidated Water Power & Paper Co.'s Appleton, Wis., U. S. A. plant will step up by 47% its capacity for burning spent sulfite liquor with the construction of new boiler facilities. . . . Pollock Paper Corp., Dallas, Texas, subsidiary of St. Regis Paper Co., has been merged into the parent organization. . . . Mead Containers Inc. (wholly-owned subsidiary of the Mead Corp.) has acquired the Display div. of Gibraltar Corrugated Paper Co. Inc., Jersey City, N. J.



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WORLD PULP & PAPER Technical News

Brazilian Hardwood Kraft

OVERBECK, WILHELM, and AGOTTANI, CYRO. Das Papier 12, no. 21/22: 578-85 (Nov., 1958). [In German; English and French summaries] A.B.I.P.C. 29: 890.

A series of kraft cooks were made on 11 species of Brazilian hardwoods, individually and in a mixture containing equal weights of each. The woods differed widely in lignin and alcohol extractive contents and in specific gravity, but relatively little in pentosan content. The wood mixture showed an average lignin content of 26.5% and an average pentosan content of 13.5%; it gave a pulp yield of 52.8% which contained 14.2% screenings. Two of the woods evaluated proved unsatisfactory for individual kraft pulping: Canela preta gave a high amount of screenings, and Cangerana gave a low pulp yield because of its high lignin and unusually high (19.7%) extractives contents. When these two species were excluded from the mixture, satisfactory pulps were obtained. When they were included, good results could be obtained when the mixed pulp was treated mechanically prior to bleaching. Apparently, each species in the mixture reacted as it did when pulped alone; hence pulp uniformity could not be improved by varying the cooking conditions. A mixture of nine species (without Canela preta and Cangerana), when digested for 2.25 hr. until a maximum temperature of 175°C. was reached (followed by immediate blowing of the digester), gave 45.5% unbleached screened pulp and 44.2% bleached pulp (of 84% G.E. brightness) which showed satisfactory strength properties. The economics of pulping these mixed hardwoods are discussed.

Bituminized Waste Paper

MYSLINSKA, ZOFIA, and PALENIK, KAROL. Przeglad Papierniczy 14, no. 6: 164-70 (June, 1958). [In Polish; Russian and English summaries] Abstr. Bull. I.P.C. 29: 884-5.

Papers containing 30-45% paraffin or bitumen were obtained by impregnation of kraft paper sheets. In a series of laboratory experiments, paraffin was removed from the waxed-paper samples by extraction with trichloroethylene (*I*) or carbon tetrachloride (*II*) and by treatment with sulfuric acid and sodium hydroxide. The fibers from bituminized paper samples were recovered by *I* or *II* extraction and by fiberization in a laboratory hydapulper of shredded paper suspensions containing 1.5-2% sodium hydroxide and 3-5% xylene or benzene. *I* was found to be better than *II* for extraction of paraffin: almost complete (98%) removal of paraffin was obtained in 50 min. with a solvent: waste-paper ratio of 10:1. The removal of 95% bitumen by either *I* or *II* required a much higher solvent: paper ratio and longer extraction time. Determination of the mechanical properties of handsheets from recovered fibers showed that the more complete the paraffin or bitumen removal, the higher the quality of paper from recovered fibers. Extraction of waxed paper with 0.1% sulfuric acid, followed by extraction with 2% sodium hydroxide resulted in a fiber loss of up to 22% and low mechanical strength properties of paper from dewaxed fibers. Complete removal of bitumen and good-quality handsheets were obtained from mechanically treated (fiberized) bituminized paper. The results of laboratory experiments were fully confirmed in plant trials. Considering the low cost of bitumen and the relatively high cost of organic solvents, only the mechanical treatment of bituminized waste paper can be recommended for recovery of fibers on an industrial scale. However, because of the relatively low consumption of *I* and the market value of paraffin, the recovery of both fibers and paraffin by *I* extraction of waxed waste papers can be considered economically sound. A description is given of equipment suitable for this purpose.

Presented with permission of The Institute of Paper Chemistry, under supervision of Curtis L. Brown, editor of IPC Bulletin. Photostats or translations of original reports available at reasonable cost by writing Eugene Bunker, librarian, Institute of Paper Chemistry, PO Box 498, Appleton, Wis., U.S.A.

Acid Cooks—High Yield

HALL, LARS, and STOCKMAN, LENNART. Svensk Papperstidn. 61, no. 20: 871-80 (Oct. 31, 1958). [In Swedish; English and German summaries] Abstr. Bull. I.P.C. 29:881.

Sprucewood chips were cooked by the sulfite process at pH 1.5, 4, and 6. At each pH, three cooking temperatures (10°C. apart) were chosen so that the middle temperature produced a pulp of Roe number 6 in 3 hr. These middle temperatures were 130, 160, and 180° for pH 1.5, 4, and 6, respectively. Pulp yield within each pH group decreased with increasing temperature at constant Roe number. From the point of view of pulp yield, it is advantageous to cook at pH 6 for Roe numbers above 7 and at pH 1.5 for Roe numbers below 7; the yield at pH 4 was always 1-3% below the better one of the other two pH values. Maximum brightness for pH 1.5 was obtained at Roe number 2 (68% G.E.), for pH 4 at Roe number 5.5 (69% G.E.), and for pH 6 at Roe number 11 (63% G.E.). Pulp viscosity fell rapidly with rising pH. Mechanical strength properties were best in pulps cooked at pH 4; they showed a breaking length of 12,000 m., a burst factor of 90, and tear strength and folding endurance considerably better than those of ordinary sulfite pulps. The high yield, brightness, and strength of these pH 4 pulps should make them of interest to mills having facilities for cooking with sodium bisulfite.

Willow Pulp—Poland

BACZYNSKA, KRYSTYNA. Przeglad Papierniczy 14, no. 7: 198-201 (July, 1958). [In Polish; Russian and English summaries] Abstr. Bull. I.P.C. 29: 889-90.

Salix alba (I) and *Salix pyramidalis (II)* wood, used in experimental kraft cooks, contained 53.28 and 54.56% cellulose, 19.7 and 19% lignin, 16.6 and 17.3% pentosans, 2.57 and 2.99% extractives, 17.7 and 14.5% substances extractable with 1% alkali, and 0.56 and 0.32% ash, respectively. Pulps of a hardness of 70-85 Sieber units were obtained by cooking *I* at 155°C. for 4 hr. with a liquor containing 21% active alkali (as sodium hydroxide), and *II* at 170° for 2 hr. with 17% active alkali. The pulp yields were 53.3-58.8% from *I* and 58.3-59.2% from *II*. At a freeness of 50°S.-R., the breaking length, burst strength, and tear strength of *I* and *II* pulps were 8720-9600 and 8400-9500 m., 5.7-9.1 and 5.8-9.1 kg./sq. cm., and 83.2-97.1 and 94.4-112 g., respectively. A comparison of pulping conditions and properties of *I* and *II* pulps with pinewood, poplarwood, and reed pulps gave the following results: the pulping conditions for *I* and *II* are similar to those needed for poplarwood; the alkali and steam consumption in willow pulping is lower than in pinewood pulping; the mechanical strength properties of willow pulps are inferior to those of pinewood and poplarwood pulps and comparable with those of reed pulps.

Photo by Ewing Galloway, N. Y.

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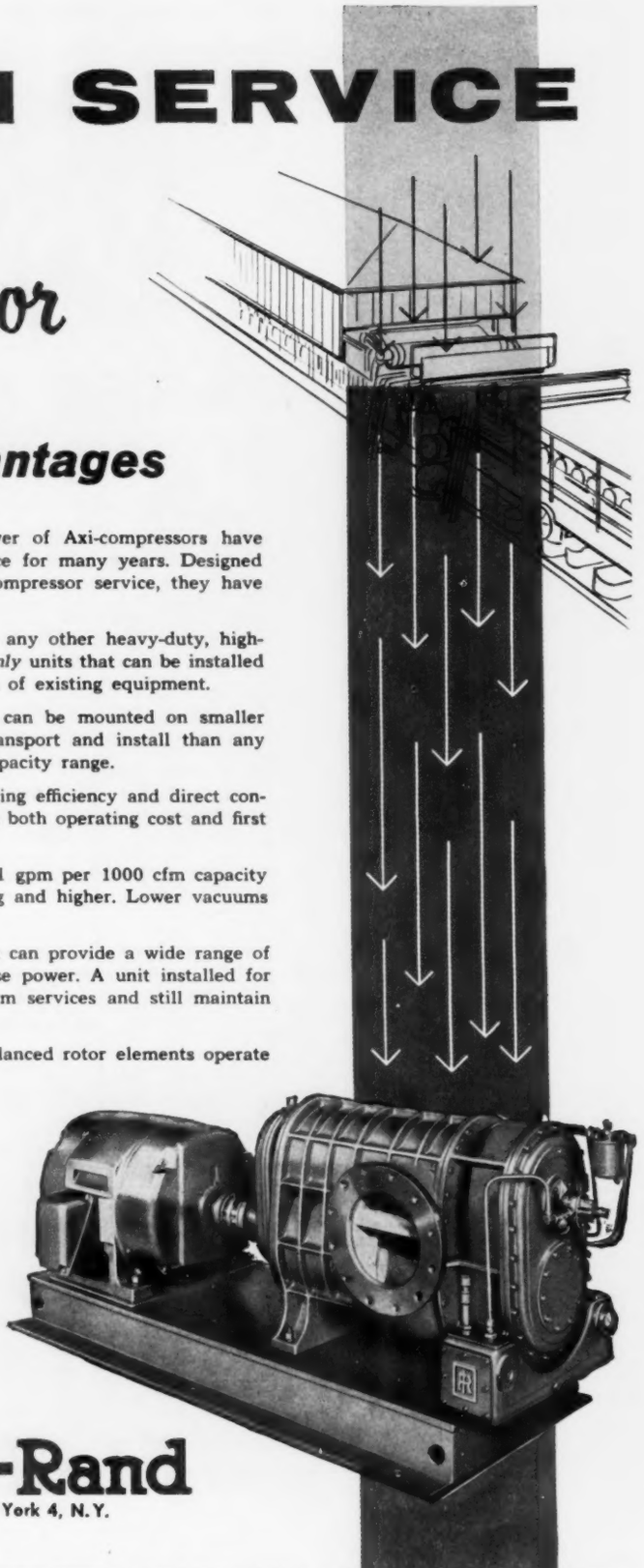

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Greater Versatility. Any Axi-vacuum pump can provide a wide range of vacuum simply by changing the driver horse power. A unit installed for high vacuum, may be used on lower vacuum services and still maintain its high operating efficiency.

Low Maintenance. The two dynamically balanced rotor elements operate with no metal-to-metal contact, virtually eliminating mechanical wear.

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The Arithmetic of Materials Handling

Fuller Airveyor, powered by diesel-driven blower, conveys wood chips from chip hopper at unloading dock to chip loft over digesters, at the Ocean Falls, British Columbia, paper mill of Crown Zellerbach Canada, Ltd.

FULLER PNEUMATIC CONVEYING SYSTEM SPEEDS WOOD CHIP HANDLING FOR CROWN ZELLERBACH

Chips are conveyed at 67 tons an hour through 1760 ft. Fuller Airveyor® system at Crown Zellerbach Canada, Ltd. Wood chips for kraft paper production are picked up at dock-side and are sped one-third of a mile through a 16-inch pneumatic pipe line. With few moving parts, the Airveyor requires practically no maintenance. Operation of this air and moisture-tight system is unaffected by exposure to the elements.

Here is a good example of the ease with which a Fuller Airveyor conveys over long distances. The Airveyor is also a highly compact and flexible system for moving almost any dry, finely-divided bulk material. The pneumatic lines turn sharp corners, run between plant floors, fit snugly into unused, overhead spaces — without disrupting existing facilities.

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SAMUEL M. LANGSTON CO. • CAMDEN 4, N. J.
MAY 1959 | *Published quarterly for the information of paper and board mills* | VOL. 1, NO. 2

'Happy With New Langston Winder'

RUNS BETTER ROLLS AT CONTINENTAL PAPER

Automatic Control, Rugged Construction Help End Guesswork and Roll Telescoping

"We're happy about our new Langston winder," says L. G. Wilder, mill superintendent of Continental Paper Company, Ridgefield Park, N. J.

"We can better control the density of our rolls than ever before. We regularly get quality rolls. Spoilage is kept to a minimum," Wilder adds.

No Guesswork

The new Langston winder has been in operation since last December. It takes portions of the production of a 132-inch paper machine and of a 122-inch paper machine and rewinds rolls up to 72-inch diameters.

"There's no guesswork on the part of the operator," explains Maurice Strelitz, engineering supervisor at Continental Paper. "We're rewinding high quality folding boxboard, ranging in caliper from 16 point to 50 point. We know the best settings for the various basis weights. Thus, we can set for what we want.

Rugged Construction

"Part of the credit for uniform density must go to the extra heavy and rugged construction of the rider roll assembly. With it we've been able to reduce telescoping of the newly wound roll to an absolute minimum.

"We used to have to stop and put a collar clamp on the roll to prevent telescoping. Now we never have to do that.

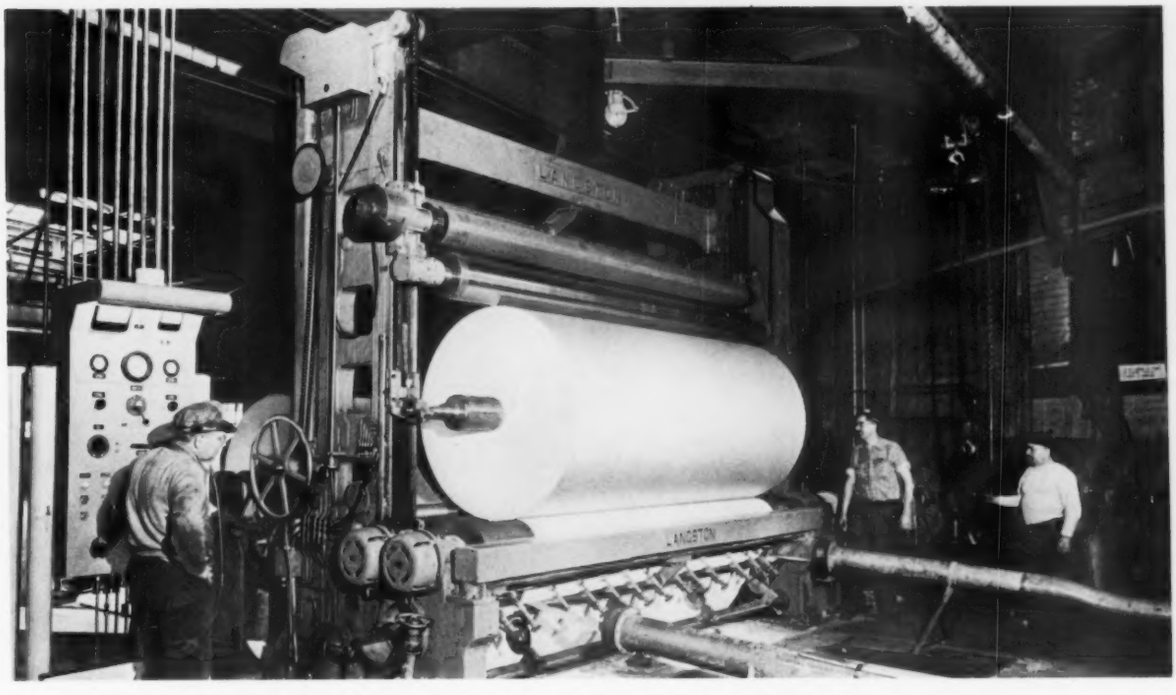
(*Continued on Page 2*)

Langston Offers New Bulletin On New Shaftless Backstands

Langston has published a new eight-page bulletin, *Shaftless Unwind Stands,* covering latest developments in this equipment for rewinding and converting applications.

The bulletin is designed to be of help to those in paper and board mills who are responsible for recommendations and decisions on slitting and winding equipment and converting operations. It describes the latest engineering developments in shaftless unwind stands and covers important details with photographs, description and engineering specifications.

Write to Samuel M. Langston Company, Camden 4, N. J., for copies and ask for *Shaftless Unwind Stands,* bulletin number 222.



BUILDUP. Boxboard is slit and rewound on new Langston winder at Continental Paper Company.

Langston Winder Produces Rolls Of Better Quality At Continental Paper Co.

(*Continued from preceding page*)

"Part of the credit, too, belongs to the automatic tension control in the drive. As the parent roll decreases in diameter, the braking automatically compensates for the reduction in diameter and results in rewound rolls of more uniform density and higher quality.

Fully Satisfied

"The winder is rated at 2000 feet per minute. We've been running it at 1500-1800 fpm and have had no trouble at all in keeping up with the portion of our production from the paper machines that goes into roll orders.

"You can say we're fully satisfied with our Langston winder," Strelitz concludes.

The new winder replaced a Langston winder in operation at Continental Paper for 37 years. The old winder was designed for 600 fpm but was operating at 1500 fpm and still turning out good rolls, Strelitz reported, but the Company wanted more rugged and more versatile equipment.

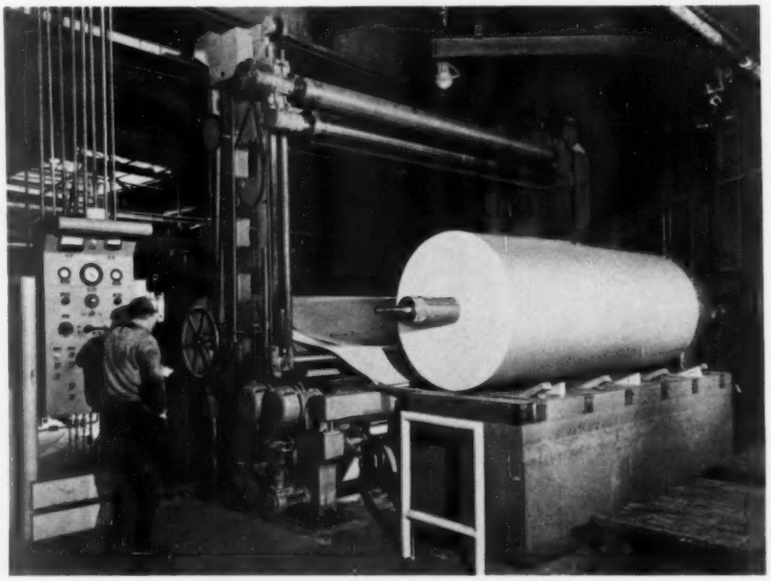
Utilized Recent Alterations

Four years ago a new 125-horsepower drive was installed on the old winder by another company, as was a roll ejector. Langston engineered the new installation to function with those recent alterations to the old machine and thus saved as much as possible for Continental Paper.

The new winder achieves quality rolls and improves efficiency in production with such features as hydraulic control of the rider roll assembly, pneumatic clutch on the rider roll, pneumatic braking to control the force required to raise the rider roll as the rewound roll increases in diameter, automatic roll ejector, Revolvator roll drop and pneumatic Tidland core shafts.

The core shafts are pulled from the rewound rolls with an Ingersoll Rand pneumatic winch. Trim is removed by air suction through flexible conduits to a fan where it is chopped and blown through pipes for about 200 feet to the beater.

The winder also utilizes a Dynamatic Eddy current clutch drive, and on the backstand it uses a matching Eddy current brake providing constant tension control during the unwind.



EJECTION. Rewound rolls are pushed onto Revolvator roll drop. Tidland core shaft will be pulled out by Ingersoll Rand pneumatic winch.

CLEAN CUT. Quality of roll is checked by finishing room foreman and operator.

TUCK IS MADE and rewind is ready to start.

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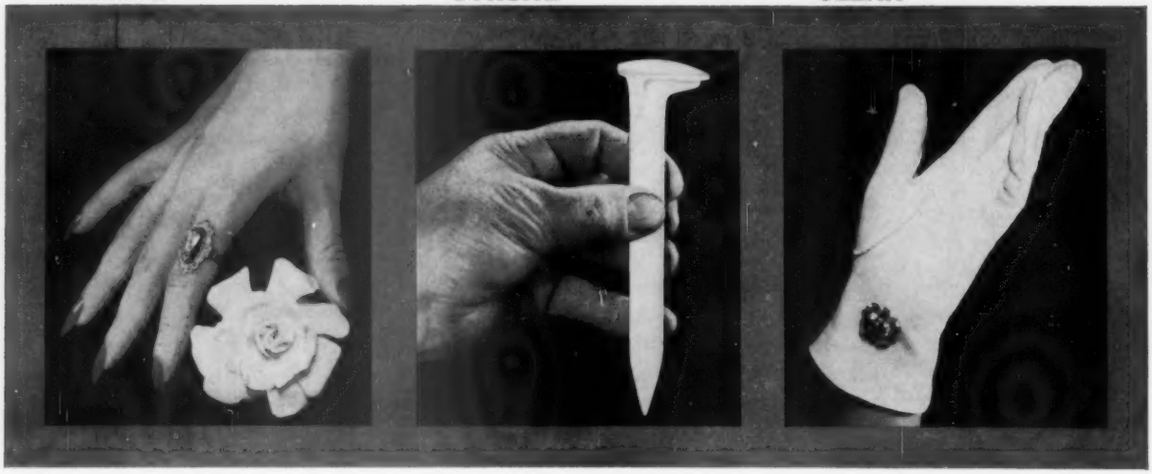

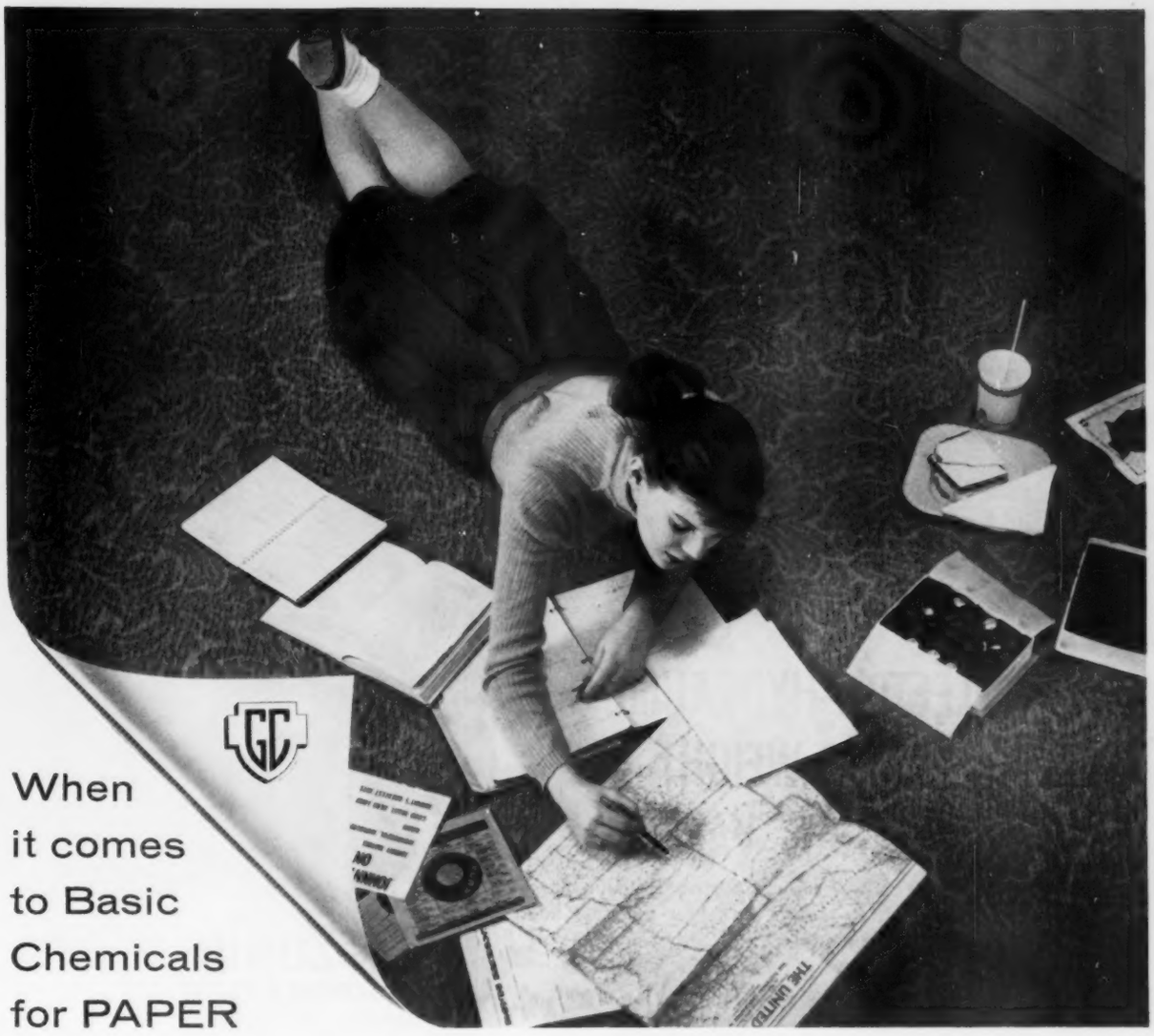

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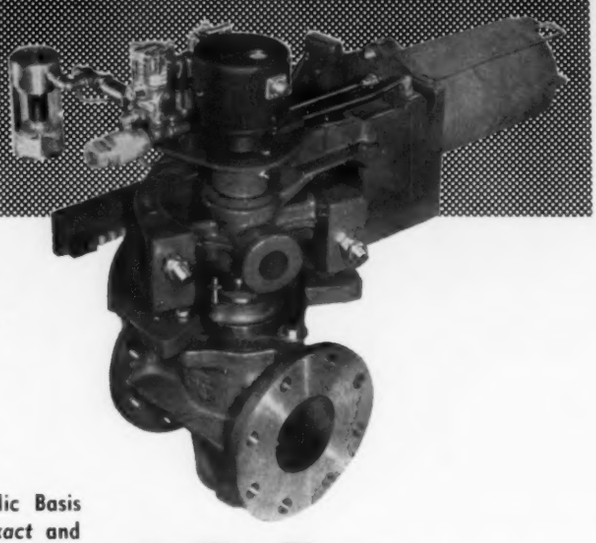

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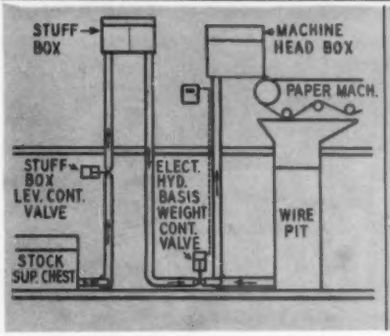

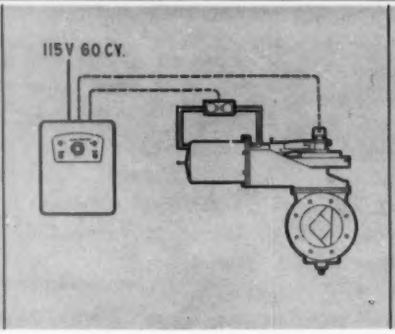

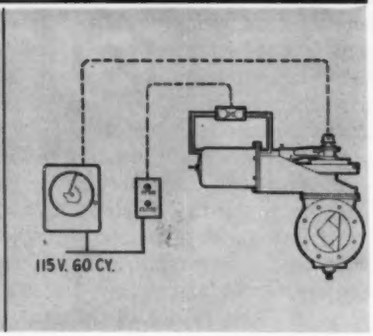

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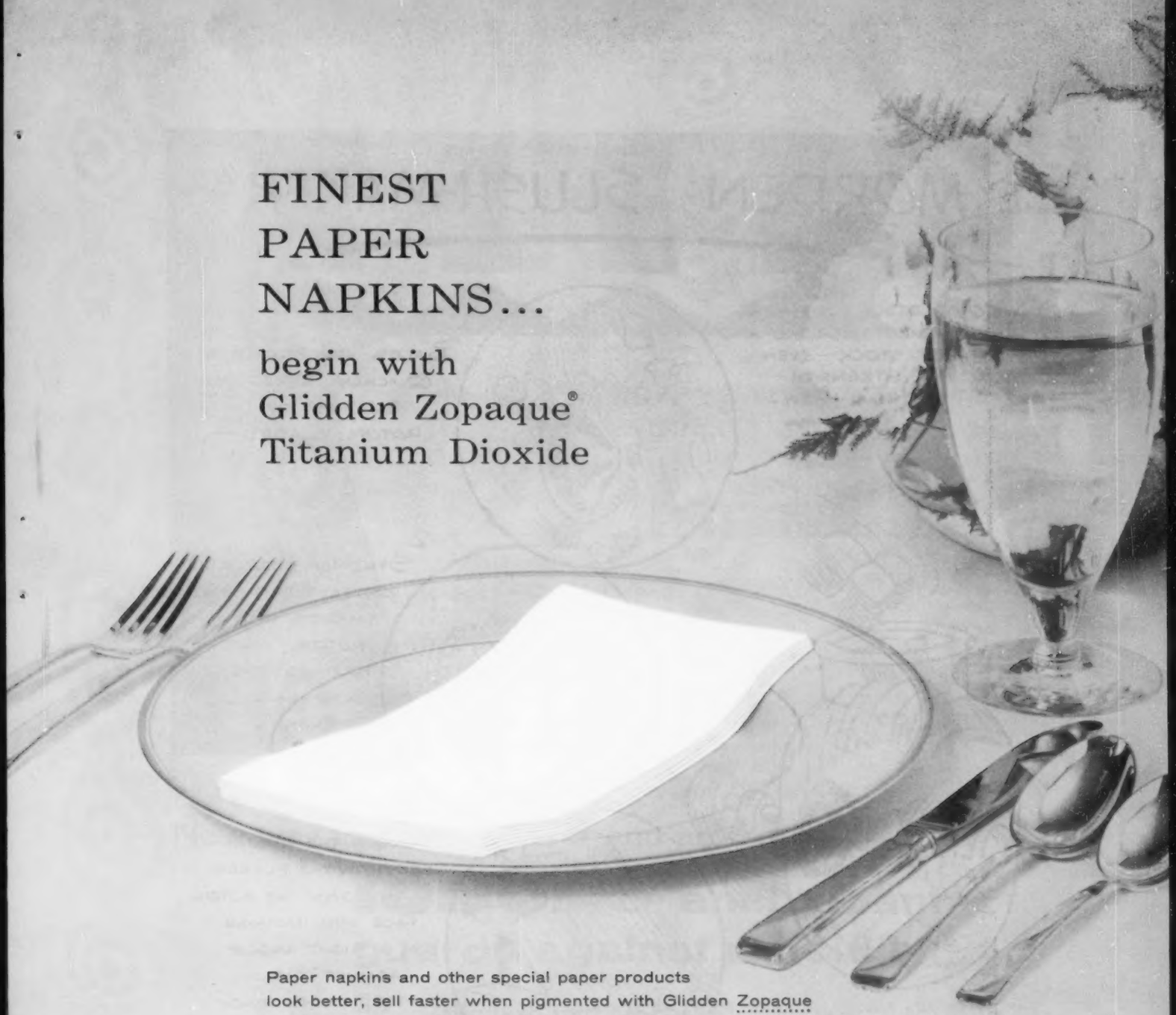

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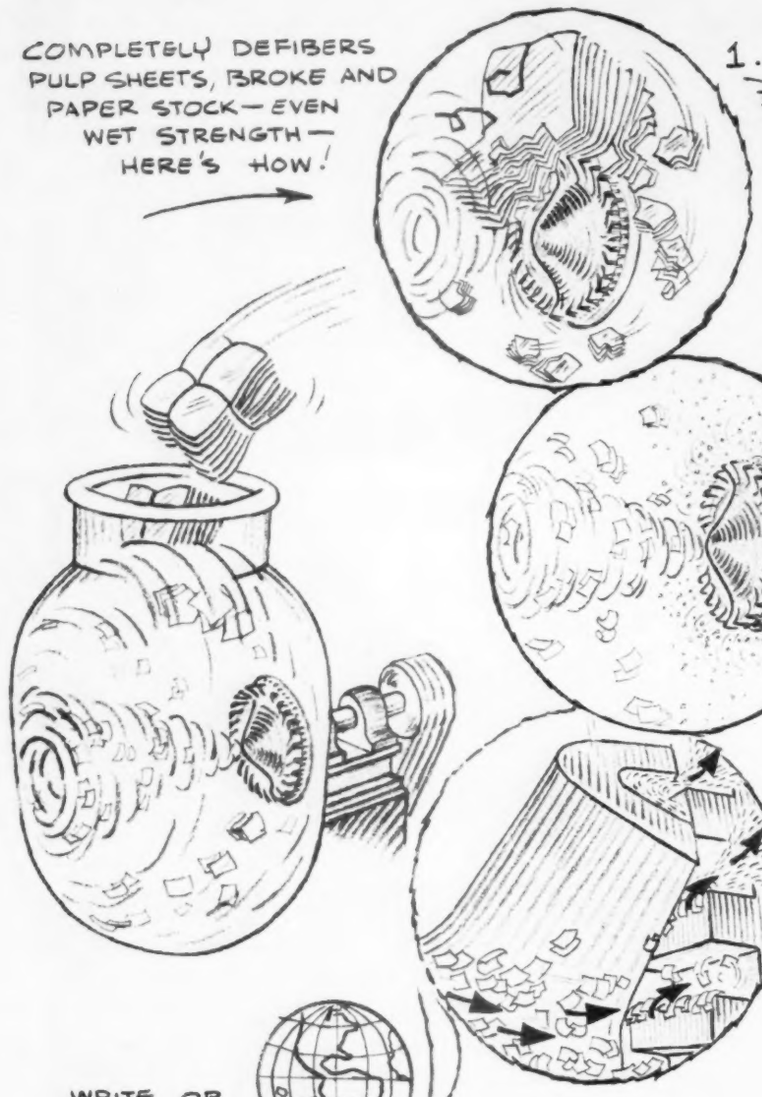

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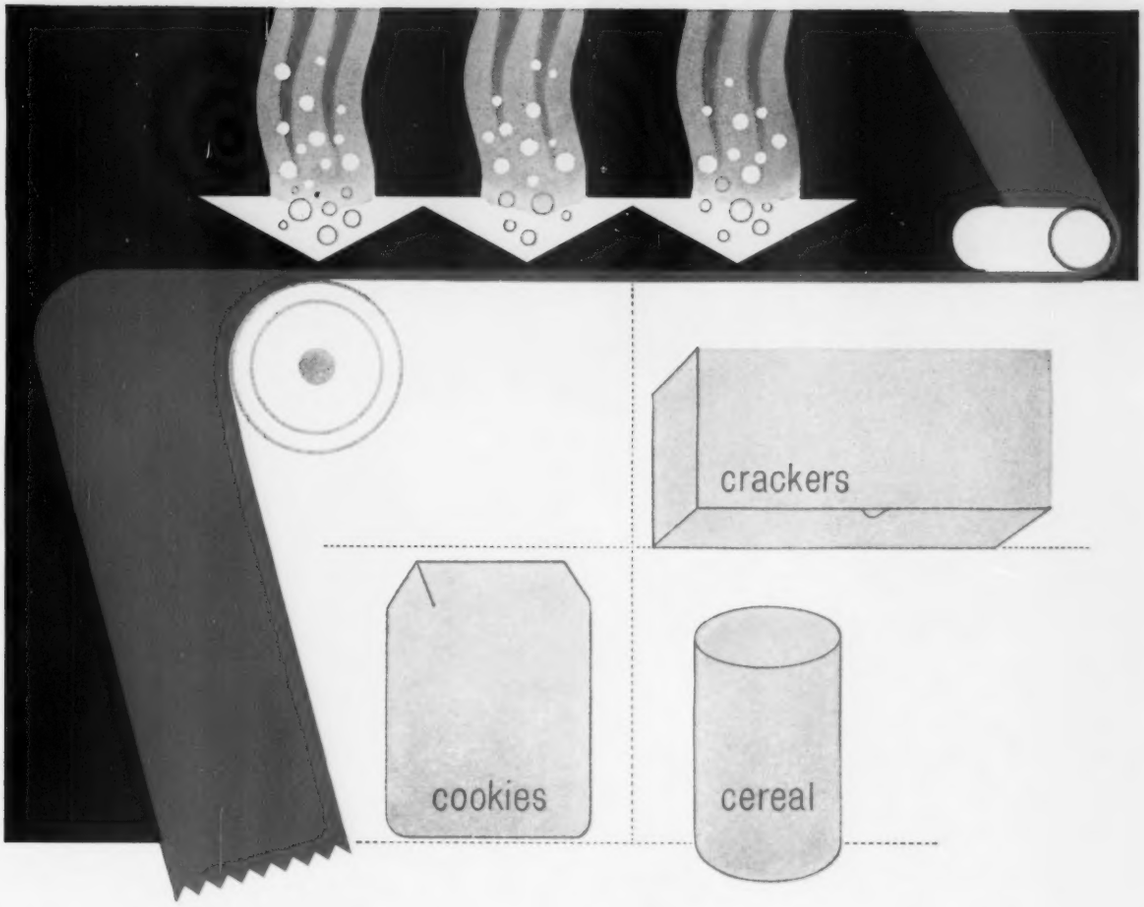

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IN CANADA: Chemical Division, Shell Oil Company of Canada, Limited, Montreal • Toronto • Vancouver

SHELL

ESCO DIGESTER CASTING

still going strong AFTER 28 YEARS

This *ESCO* Alloy 45S top digester relief strainer casting is still resisting the corrosive attack of sulphur dioxide, acid fumes and steam at 280°F. and 80 psi. after 28 years of continuous service. This is but one of many, many testimonials that demonstrate the thorough understanding of pulp mill requirements by *ESCO* metallurgists.

ESCO knows digester systems and makes a complete line of custom valves and fittings. *ESCO* custom castings in Alloy 40, 40L, 45L, 45S, 43H, 32C, 20 (Duriron) and Hastelloy* are found in pulp mills everywhere.

Tell your nearby ESCO representative about corrosion problems in your plant, or write direct. Ask for your free copies of Alloy Notebook No. 7, "What Is Corrosion?", and the Process Equipment Catalog 175.

ALLOY CASTING INSTITUTE ACI MEMBER

ESCO®

ELECTRIC STEEL FOUNDRY COMPANY

2167 N. W. 25TH AVE. • PORTLAND 10, OREGON

MFG. PLANTS AT PORTLAND, ORE. AND DANVILLE, ILL.

Offices in Most Principal Cities

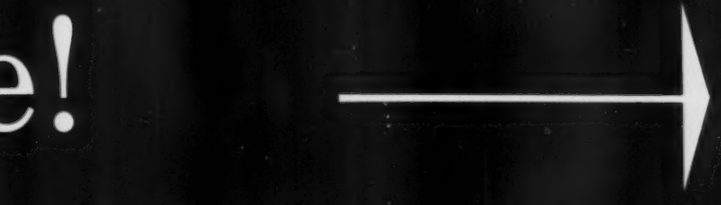
ESCO INTERNATIONAL, NEW YORK, N. Y.

IN CANADA ESCO LIMITED

*Trademark Union Carbide Corporation

New!

Reliance Super 'T' V*S Drives put more power, faster response and greater overload capacity into a 35% smaller package!



New 50 hp. Super 'T' V★S control cabinet compared with 50 hp. old style drive on Reliance production line.

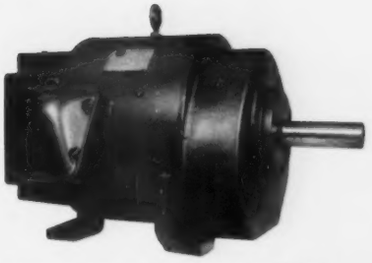
The secret is a new power unit, new controls, and the Super 'T' D-c. Motor

The new Super 'T' power unit packs extra punch into a smaller space. Like the Super 'T' D-c. Drive Motor, it uses Class B insulation and 60°C temperature rise design, permitting 100% overloads. Special control apparatus design has been engineered for the Super 'T' V★S. This systematic balance of power unit, drive motor, and controls forms a single, fast-functioning unit to provide a wide range of variable operating speeds from a-c. circuits.

40—150 hp. Super 'T' V★S available for immediate delivery. Contact your local Reliance Representative for delivery schedules of the complete line, 1—350 hp.

RELIANCE ELECTRIC AND ENGINEERING CO.

The Super 'T' V★S Drive, a complete power package, provides variable speeds from a-c. circuits



SUPER 'T' D-c. DRIVE MOTOR

OPERATOR'S PANEL

Wide range of operating speeds from a-c. circuits adds flexibility to existing production machinery. Speed changes are stepless and can be varied while equipment is operating or stopped.

Controls

New control relays, both a-c. and d-c. Field tested by three Reliance customers—for over 20 million operations without failure.*

Power Unit

Two-bearing power units are always in alignment, eliminate bearing and coupling problems.

Ventilation

Power unit cooling air is exhausted directly out of cabinet. Provides separate ventilation systems for controls and power unit. Controls are kept cooler, materially extending service life.

Insulation

Power units include new NEMA redesigned d-c. and a-c. machines. Units are smaller. Class B insulation with 60° C temperature rise allows more power in less space.

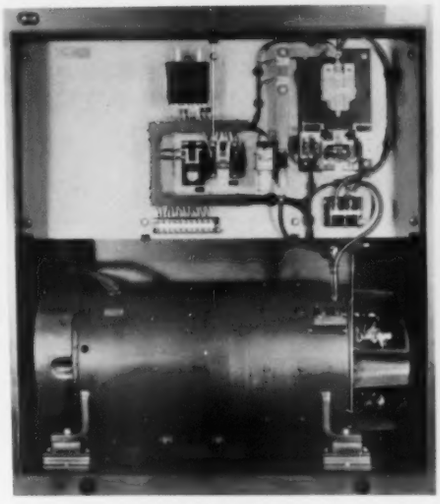
Drive Motor

Super 'T' D-c. Drive Motors give fast response to speed and load changes, take repeated 100% overloads of one minute duration without failure.

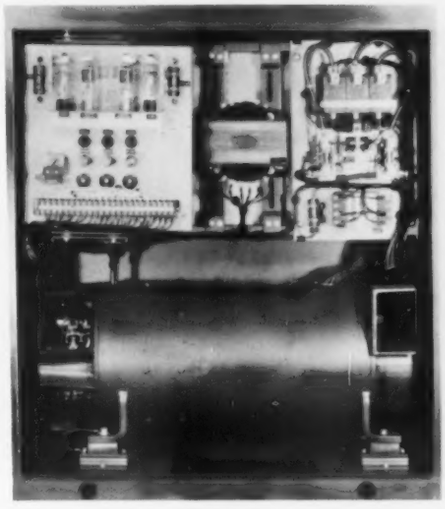
Design

Every component designed for matched performance. New motor controls, new power unit and new drive motor provide balanced operation of production machinery.

*Names on request.



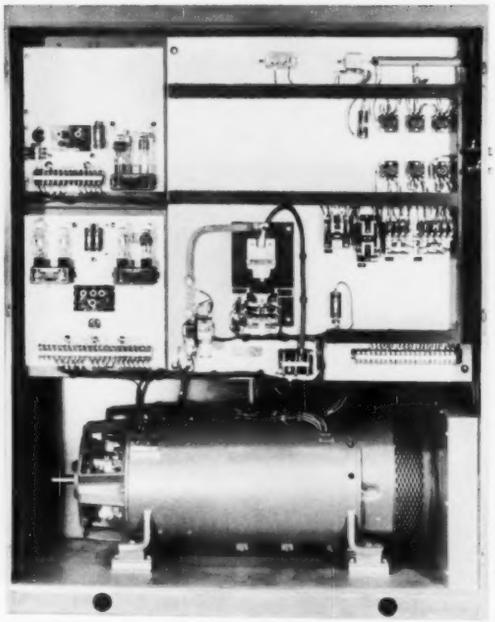
FRONT



BACK

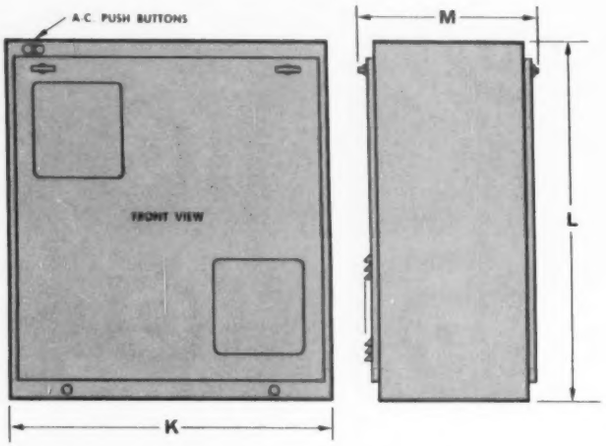
"Custom" Super 'T' V★S Drive for more flexibility, more automatic operation

Every function of the standard model and more. Custom units are designed to incorporate additional controls for engineered installations. Custom models, through the use of feed-back regulation, will provide complete system automation. Control panels are larger to accommodate controls for regulating speed, position, torque and any other operating variables.



Dimensions of Standard Super 'T' V★S Control

FLOOR MOUNTED, 1-150 V★S



Dimensions are in inches and correspond to letters shown.

V★S HP.	CABINET DESIGN	K	L	M
1-15	1SF	35	40	16
20-30	2SF	40	45	20
40-60	3SF	45	50	23
75-100	4SF	55	55	26
125-150	5SF	70	60	30

Product of the Reliance Electric and Engineering Company, manufacturers of a-c. motors, Master Gearmotors, Reeves Drives, Super 'T' D-c. Motors, generators, controls and engineered drive systems.

RELIANCE ELECTRIC AND ENGINEERING CO.

CLEVELAND 17, OHIO
Sales Offices and Distributors in Principal Cities
Canadian Division: Toronto, Ontario

MASTER R REEVES

RELIANCE

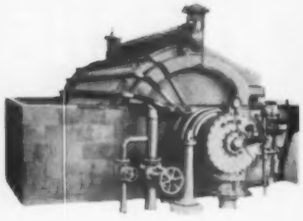
D-1618 Printed in U.S.A.

A complete line of proved and accepted

DORR-OLIVER

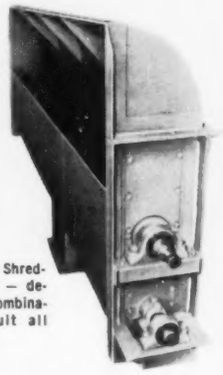
designed by

WASHERS AND ACCESSORIES



Oliver Vacuum Bleach Washer — now available in advanced designs and materials.

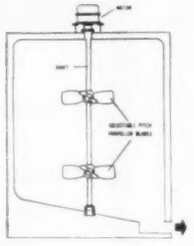
Dorr-Oliver Escoe and Nycoe Nozzles — minimize channeling and foam in the sheet.



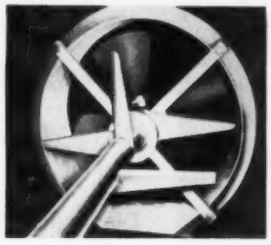
Dorr-Oliver Shredder-Conveyor — designs and combinations to suit all installations.

AGITATORS

Dorr-Oliver manufactures a variety of agitators specifically engineered to meet the specialized requirements of every operation in the bleaching system.

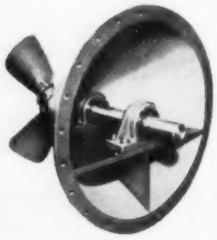


Dorr-Oliver Blending Chest Agitators — designed for proper agitation with minimum power requirements.

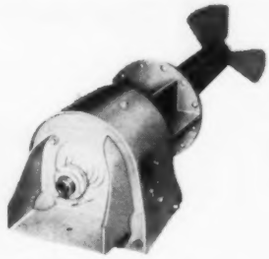


Dorr-Oliver Horizontal Chest Agitators — a complete line designed for tub or mid-feather type chests.

Dorr-Oliver Bleach Tower Agitators — tangentially mounted with either fixed or fully adjustable blades.



Dorr-Oliver Tower Agitators — for high density storage towers. Adjustable propellers.

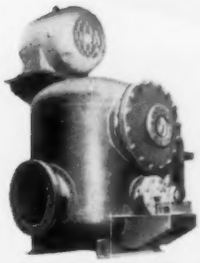


Falk All-Motor Driven Agitator — single unit motor, reducer and propeller assembly.

BLEACH PLANT EQUIPMENT

pulp mill engineers for pulp mill service

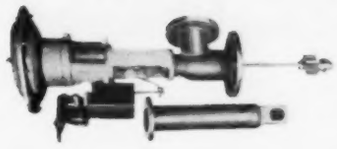
MIXERS



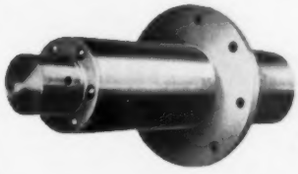
Dorr-Oliver Chlorine Mixer—rubber lined pressure chamber with internal counter-rotating propellers.

Dorr-Oliver Double Shaft Heater Mixer — rotating assemblies feature alternate propelling vanes and agitating pins. Reinforced stainless steel shell. Bearings outside shell for better protection.

NOZZLES



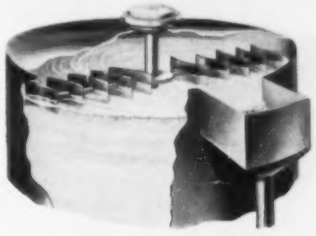
Dorr-Oliver Tower Dilution Nozzles — diaphragm actuated design features uniform, chatter-free throttling with freedom from plugging.



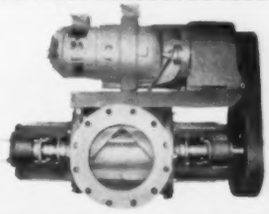
Dorr-Oliver High Density Storage Tower Nozzles — unique design with rotary oscillating action insures minimum wear and leakage.

MISCELLANEOUS BLEACH EQUIPMENT

Dorr-Oliver Top Scraper — rubber covered demountable rake arm provides continuous movement of stock towards launder. Adaptable for low density upflow bleach or chlorination towers.



Dorr-Oliver Rotary Vaned Feeder — for metering pulp or cooked chips in or out of pressure zone. Design minimizes shock loadings.



Complete research, planning and development service for bleach plant systems

Dorr-Oliver maintains complete research and testing facilities to conduct pulp and paper tests and to carry out any experimental bleaching program. Competent engineering service is also available to design complete bleaching systems to meet individual needs. For further information, write to Dorr-Oliver Incorporated, Stamford, Connecticut.

DORR-OLIVER
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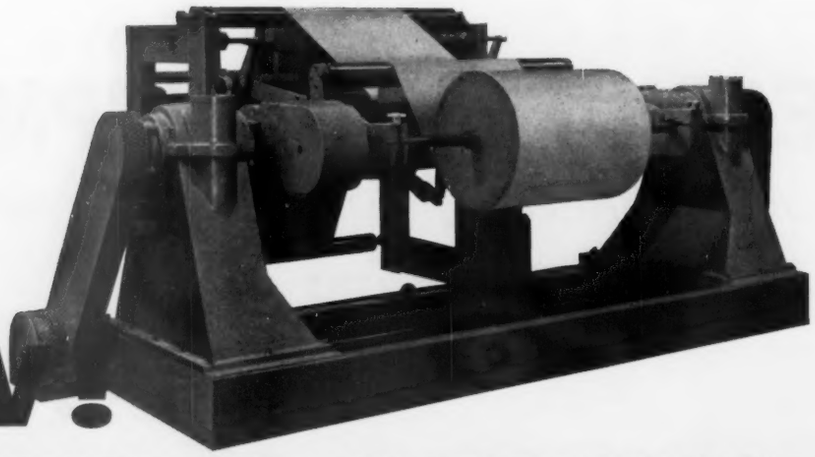
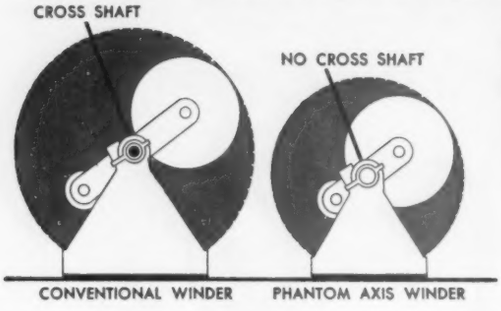
STAMFORD • CONNECTICUT • U S A



NEW!

EGAN PHANTOM AXIS TURRET WINDER



ELIMINATION OF CENTER CROSS SHAFT MAKES THE DIFFERENCE...GREATER ROLL DIAMETERS...MORE COMPACT DESIGN...LESS HEIGHT AND FLOOR SPACE

FEATURES

Smooth transfers at full machine speed with unique single motor design

Compact winder design means more rigidity; better operation at high speeds

Speeds in excess of 1000 fpm

Constant or tapered tension

Knife cut-off

Power rotation of turret

Side shifting (automatic or manual) available

Air chucking of cores or shafts (optional)

Web widths through 120″

Write, or phone Randolph 2-0200, for illustrated technical data giving complete information on the new Phantom Axis Winder Series, and its companion unit, The Egan Phantom Axis Turret Unwinder.

Egan

FRANK W. EGAN & COMPANY

SOMERVILLE, NEW JERSEY

CABLE ADDRESS: EGANCO—SOMERVILLE (NJER)

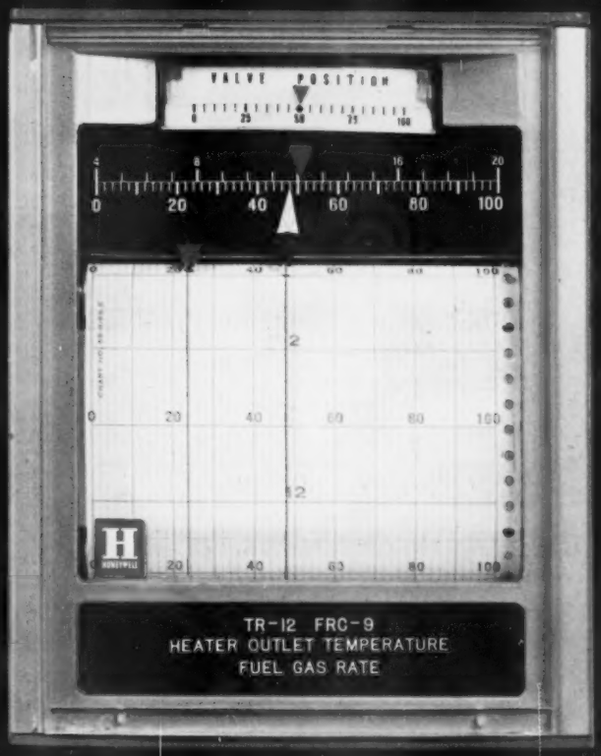
MANUFACTURERS OF PAPER CONVERTING MACHINERY: COATERS, LAMINATORS, TREATERS, GUMMERS, SATURATORS, EMBOSSERS, UNWINDS, WINDERS, DRYING SYSTEMS, AND OTHER COMPONENTS.

REPRESENTATIVES: MEXICO, D.F.–M.H. GOTTFRIED, AVENIDA 16 DE SEPTIEMBRE; JAPAN–CHUGAI BOYEKI CO., TOKYO. **LICENSEES:** GREAT BRITAIN–BONE BROS. LTD., WEMBLEY, MIDDLESEX; FRANCE–ACHARD-PICARD, REMY & CIE, 36 RUE D'ENGHIEN X, PARIS; ITALY–EMANUEL & ING. LEO CAMPAGNANO, VIA BORROMEI 1 B/7, MILANO; GERMANY–ER-WE-PA, ERKRATH, BEI DUSSELDORF.

Here it is!

Honeywell's new *ElectriK Tel-O-Set** system

...the only true two-wire system for electric process control!



No line power connections in the field. The *ElectriK Tel-O-Set* system requires no external power at any field-mounted device and uses only two wires between it and the control room. These two wires form a series circuit that carries the measurement or control signal as well as the system's power. The only line power connection is made at the receiver.

Two-wire transmission sharply reduces installation costs. Add this to the fact that the *ElectriK Tel-O-Set* system's d-c transmission eliminates the need for shielding the wires, and you have the simplest, most economical installation possible.

*Trade name, Minneapolis-Honeywell Regulator Company

H HONEYWELL

COMPARE *ElectriK Tel-O-Set* WITH ANY OTHER ELECTRIC CONTROL SYSTEM!

Here it is!

the new *ElectriK Tel-O-Set* system

. . . newest advance in industrial process control

A complete, integrated line . . .

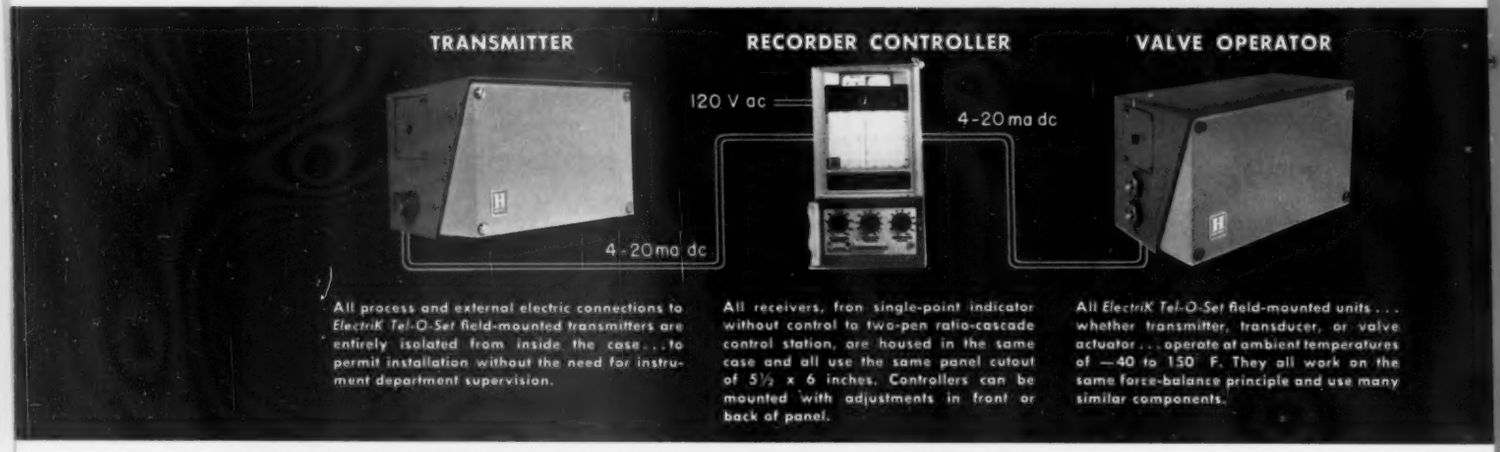
Control *any* industrial process with the *ElectriK Tel-O-Set* system. It has been designed as a complete system, rather than as a collection of individual instruments. The line consists of 22 major units which permit local and centralized data presentation, adjustable cascade control, ratio control and many other auxiliary functions. *ElectriK Tel-O-Set* transducers make the line completely compatible with your present pneumatic instruments.

. . . built for industry

Die-cast aluminum cases and stainless steel components are used throughout the line to withstand the rough handling and demanding environments of industrial applications. Standardized components, together with extensive use of quick-connect and plug-in design, mean ready interchangeability of parts, reduced spare parts inventory, easy maintenance. The modular, or "building block" concept is employed throughout for maximum flexibility.

. . . this is how it works

The basic *ElectriK Tel-O-Set* system consists of a transmitter, receiver, controller and final control element. The transmitter measures any process variable, translates it into a standard 4 to 20 milliampere direct current signal, and transmits to the receiver through a pair of copper wires. The receiver indicates or records the signal in terms of the actual value of the process variable, compares it with a pre-determined set-point, and sends the difference to the controller as an error signal. The controller then converts this into a corrective 4-20 milliampere output to operate the control valve—again transmitting over a single pair of copper wires.



All process and external electric connections to *ElectriK Tel-O-Set* field-mounted transmitters are entirely isolated from inside the case . . . to permit installation without the need for instrument department supervision.

All receivers, from single-point indicator without control to two-pen ratio-cascade control station, are housed in the same case and all use the same panel cutout of 5½ x 6 inches. Controllers can be mounted with adjustments in front or back of panel.

All *ElectriK Tel-O-Set* field-mounted units . . . whether transmitter, transducer, or valve actuator . . . operate at ambient temperatures of —40 to 150° F. They all work on the same force-balance principle and use many similar components.

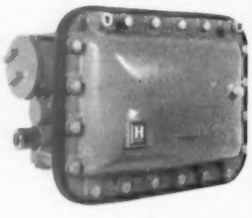
CHOICE OF THREE CASES

For field-mounted *ElectriK Tel-O-Set* units: Weatherproof for Division 2 locations; relay rack for mounting four abreast in a 19-inch rack, and explosion-proof for Division 1 locations.

All are completely transistorized and have quick-connect electric and pneumatic plugs.

Weatherproof

Relay rack



Explosion-proof

SYSTEM COMPONENTS

TRANSMITTERS
Process pressure to current (PP/I)
Differential pressure to current (Δ P/I)
Millivolt to current (MV/I)

RECORDERS
Single or two-pen recorders. Single or two-pen recording controllers with control, including simple cascade, on one pen. Two-pen recording controllers with ratio or cascade control on one pen.

INDICATORS
One pointer, with or without control
Milliammeter, with or without manual loading

CONTROLLERS
Two mode and three mode

FINAL CONTROL ELEMENTS
Current to pressure (I/P) valve operator
Electro-pneumatic positioner
Electro-hydraulic actuator

TRANSDUCERS
P/I: 3-15 psi to 4-20 ma dc
I/P: 4-20 ma to 3-15 psi
I/F: 4-20 ma dc to frequency
F/I: frequency to 4-20 ma dc

Get complete details from your nearby Honeywell field engineer. Call him today . . . he's as near as your phone.

MINNEAPOLIS-HONEYWELL
21 Penn Street, Fall River, Mass.

Honeywell

First in Control

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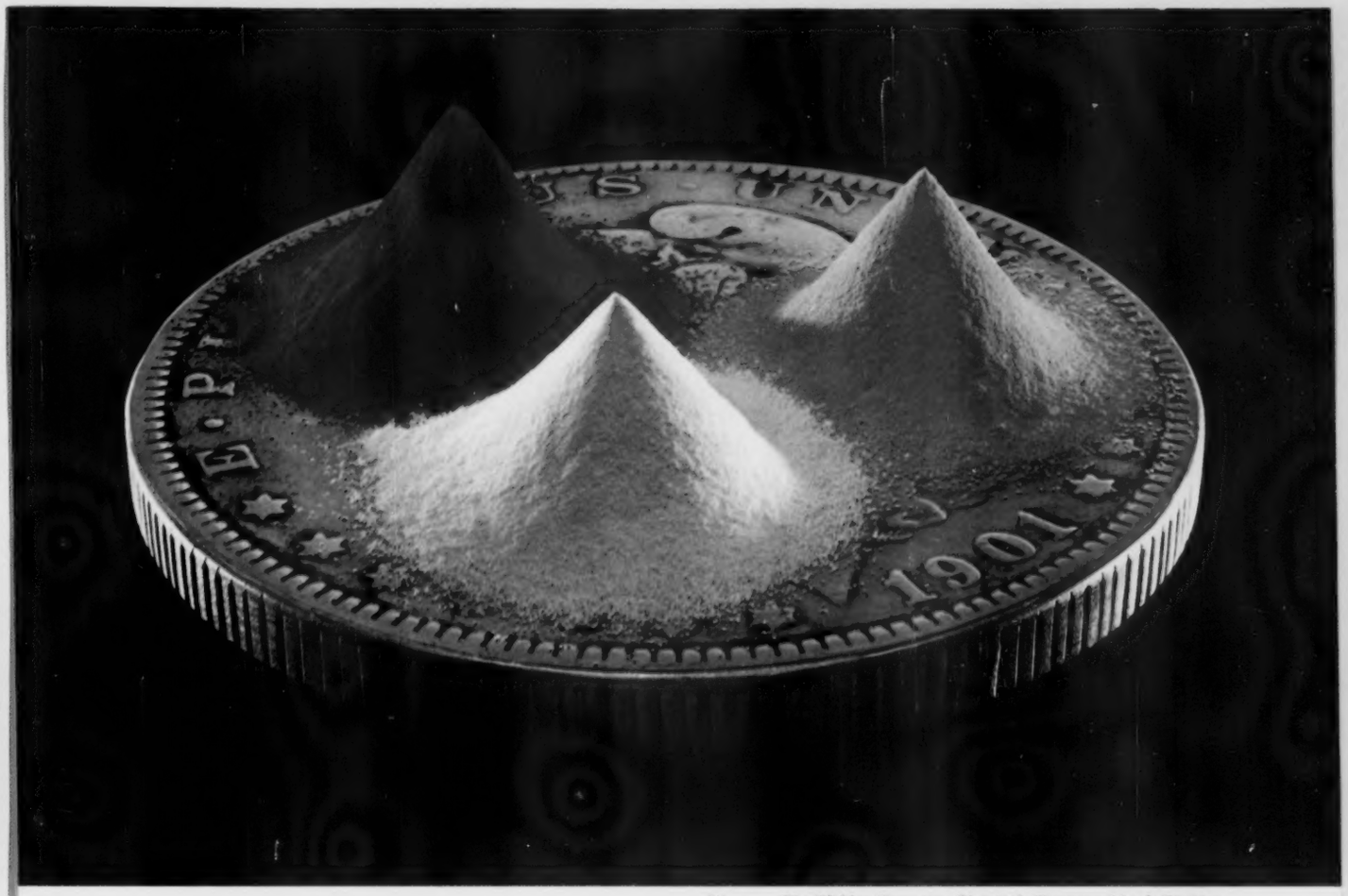


Courtesy: The Glidden Company, Chemicals-Pigments-Metals Division

Alpha® Protein...

for true colors, depth and clarity

There are at least ten potential trouble spots in the photograph above. Yet everything reproduced here with full integrity—thanks to Alpha Protein, the acknowledged best-selling binder for high solids, machine-coated offset papers.

Alpha Protein is processed soy protein, carefully controlled through all manufacturing steps to insure *uniformity* from shipment to shipment.

Unlike imported adhesive materials which are subject to price fluctuation, Alpha Protein is stable in price.

Alpha Protein gives excellent results in either conversion or on-machine coating. It is perfectly compatible with coating pigments and allows the application of coatings containing up to 60 percent or more solids.

Write for complete information.

CENTRAL SOYA COMPANY, INC.

Chemurgy Division

1825 N. Laramie Avenue • Chicago 39, Illinois

This advertisement reproduced on Alpha Protein-processed paper

From this cubicle comes advance

proof of pump performance

This master control room of Allis-Chalmers pump test floor is far removed from paper mills. Yet, engineers working here know exactly what your needs are — and which Allis-Chalmers pump will best do the job.

Suction heads, *discharge heads, gpm capacity, required horsepower* plus other essentials for satisfactory pumping performance are all proven in advance.

Performance testing like this is only one reason why A-C is recognized as a full-line leader in meeting the pump needs of pulp and paper. "Teamed" motors and control; customized standardization of parts and materials; engineering assistance and nationwide service are others.

Whatever your requirements in centrifugal pumps — from the smallest to 45,000-gpm giants — contact your A-C representative or distributor. *Or write Allis-Chalmers, General Products Division, Milwaukee 1, Wisconsin.*

ACAP is an Allis-Chalmers trademark.

A-C ALLIS-CHALMERS

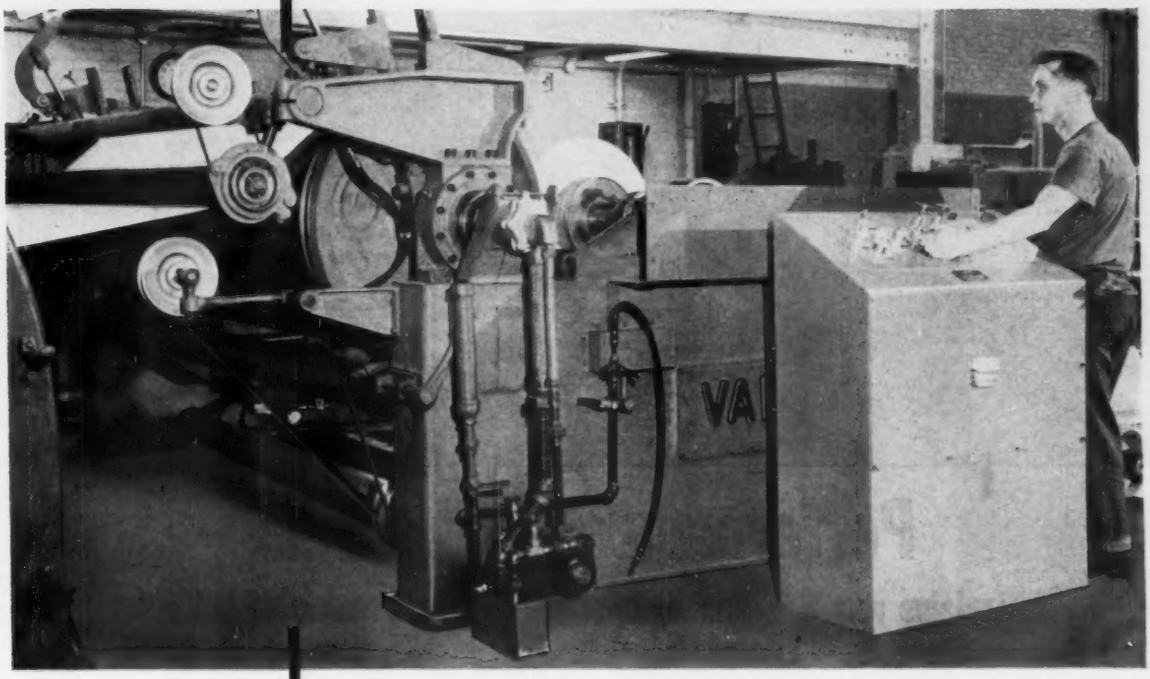
A-5981-PP

VALLEY HORIZONTAL REEL

on No. 1 Paper Machine

NEKOOSA-EDWARDS PAPER CO.

Port Edwards, Wisconsin



Level wind
Surface wind
Center wind

Horizontal Track Surface Wind Reel designed for later addition of center wind components.

A major departure in reel design to provide completely versatile operation, surface or center wind, or a combination of both, with zero loading of the spool to the drum. Spool weight supported completely by the ways with no weight component on the drum.

Reel designs include spool starters, rope systems, spool brakes, stationary or oscillating doctors, as well as automatic operating features.

write....**VALLEY IRON WORKS COMPANY**
APPLETON, WISCONSIN

From this cubicle comes advance

proof of pump performance

This master control room of Allis-Chalmers pump test floor is far removed from paper mills. Yet, engineers working here know exactly what your needs are — and which Allis-Chalmers pump will best do the job.

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A-C ALLIS-CHALMERS

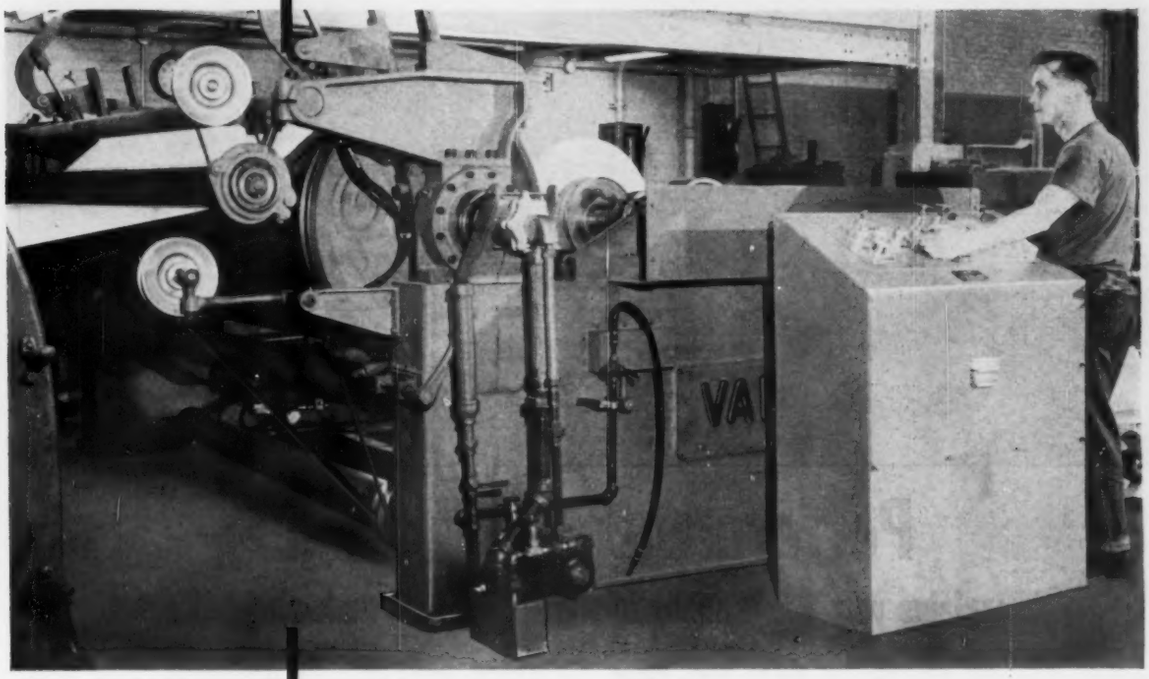
A-5981-PP

VALLEY HORIZONTAL REEL

on No. 1 Paper Machine

NEKOOSA-EDWARDS PAPER CO.

Port Edwards, Wisconsin



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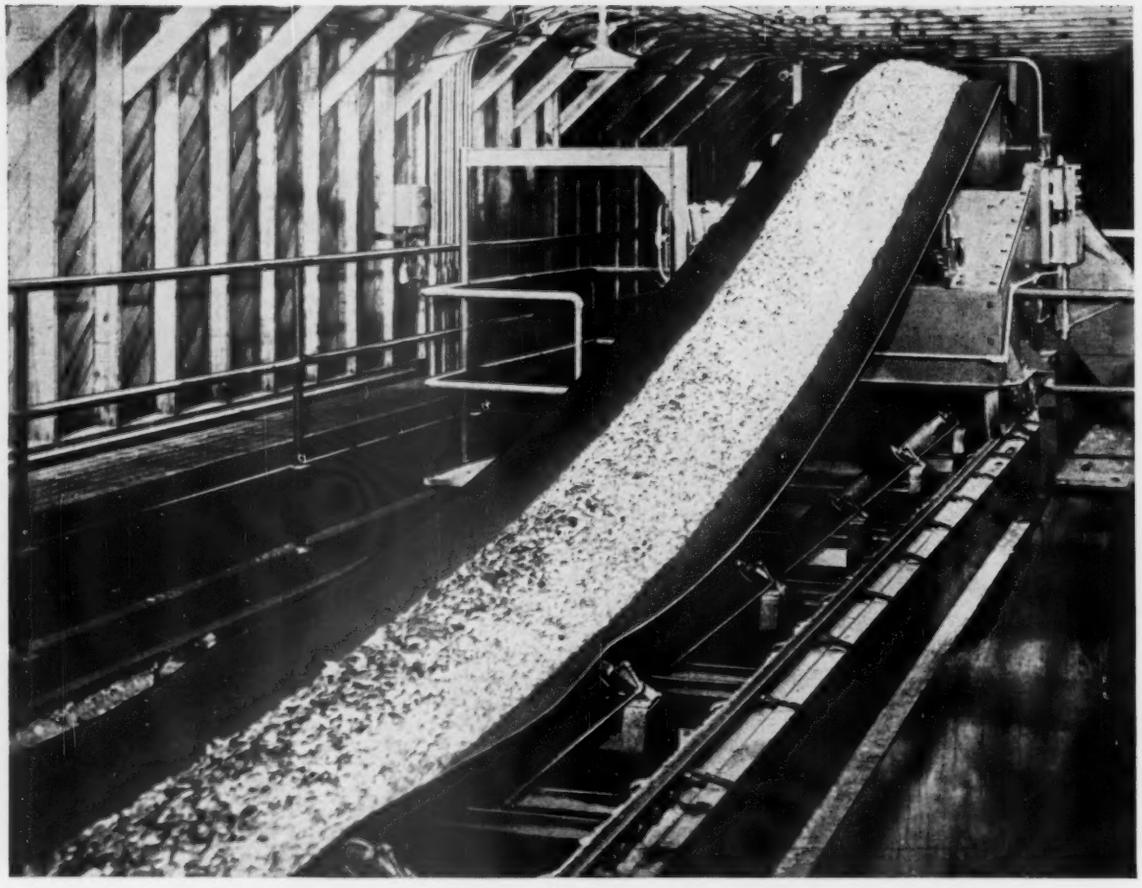
write....**VALLEY IRON WORKS COMPANY**
APPLETON, WISCONSIN

US RUBBER CONVEYOR BELTS



Performance at St. Regis

explains why U.S. Rubber is world's largest maker of belts

In the Jacksonville, Fla., plant of the St. Regis Paper Co., chips keep moving right ahead on U. S. Rubber Conveyor Belts. The "U. S." Belt shown is one of several 48"-wide belts with 45-degree troughing idlers. Note the troughability and elimination of spillage. The belts of Paracril® construction, a U. S. Rubber exclusive, are not affected by the destructive resins of pine wood chips. They are among many belts in this extensive conveyor system, producing 350,000 tons of kraft products a year.

The St. Regis Paper Co. depends on "U. S." Belts, because of their proven dependability, and trouble-free long service life. It is this type of performance and use of "U. S." conveyor belts throughout industry that explains why *U. S. Rubber is the world's largest manufacturer of belts.*

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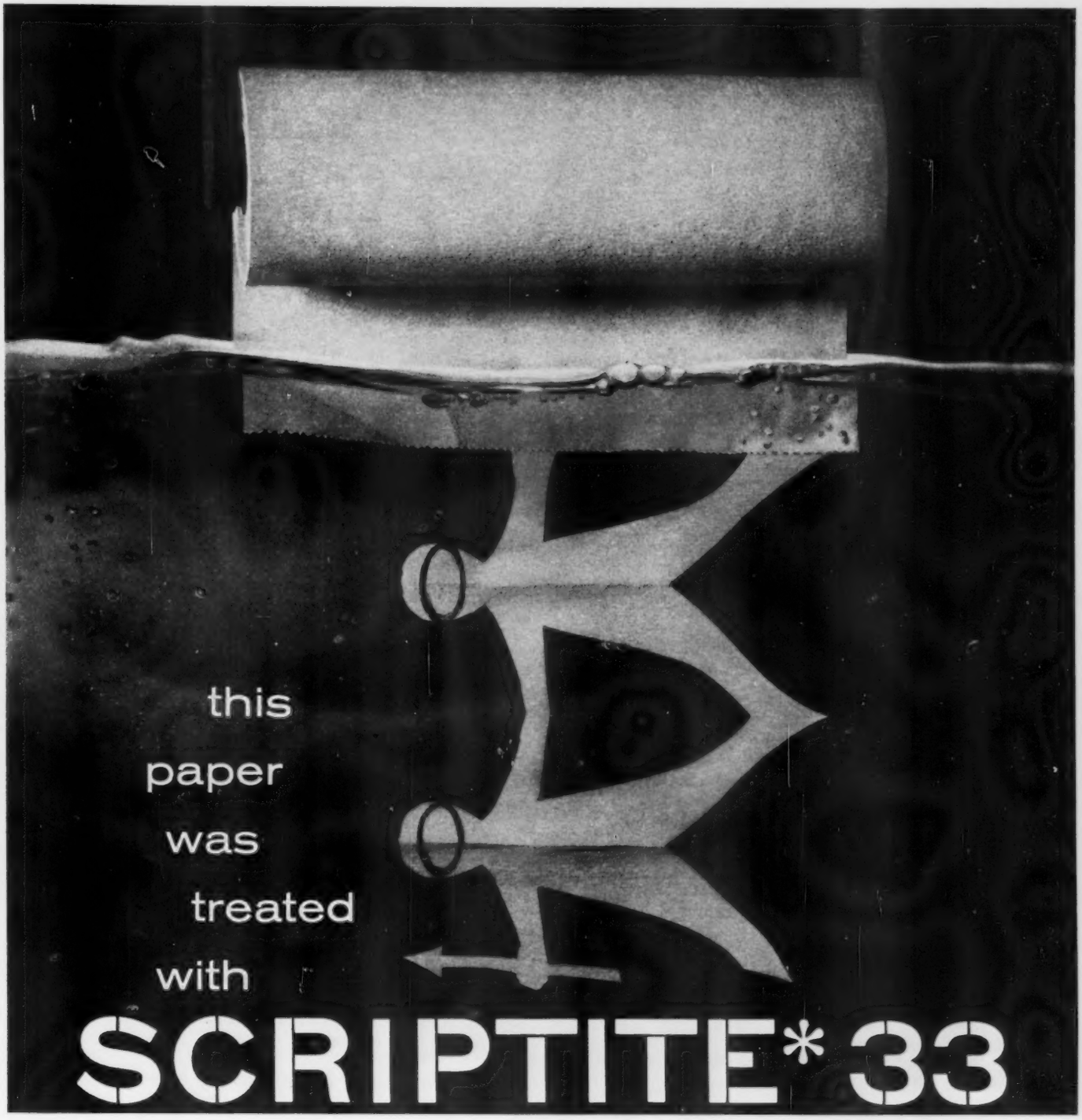

Scriptite 40, a new concept in urea-formaldehyde paper resins, imparts high off-machine wet strength with less resin add-on. Made more cationic, this water-soluble resin is strongly attracted to the cellulose, assuring greater application efficiency. Formulated for fast cure, Scriptite 40 also improves dry tensile strength, dry mullen, wet rub resistance, dimensional stability, and folding endurance. For samples and technical data, write: Monsanto Chemical Company, Plastics Division, Room1107, Springfield 2, Mass.

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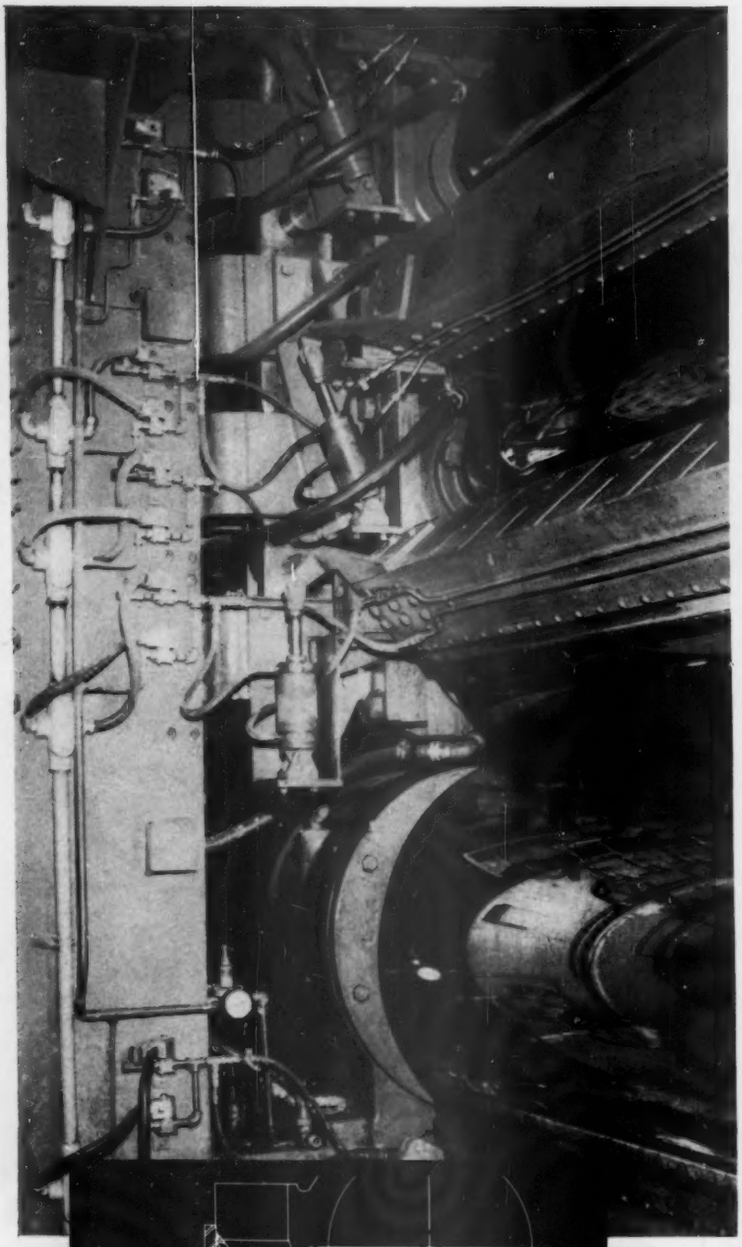

Clean rolls and Lodding Doctors

CLEAN ROLLS go hand in hand with Lodding Doctors. Mills throughout the country and many abroad have found this to be so — just as in the installation of calender doctors at the Chillicothe Paper Company.

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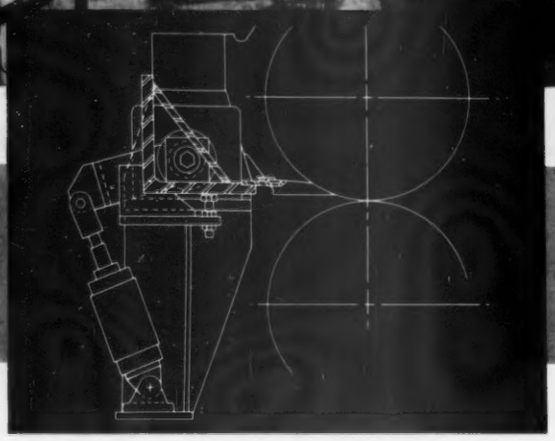

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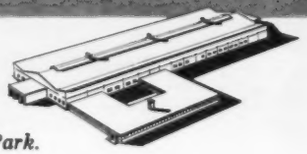
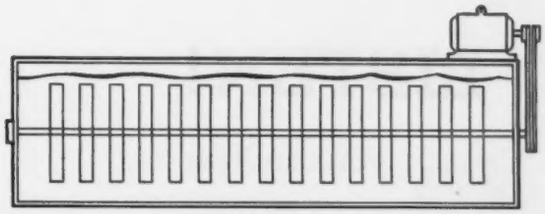


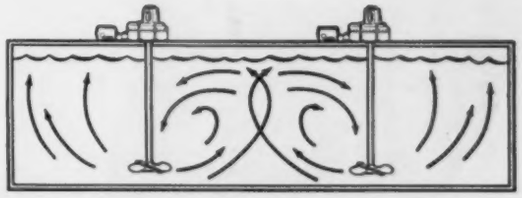
We welcome your inspection of our new plant located in Worcester's Auburn Industrial Park.

Look what happened when this mill stopped **sloshing** *and started* **mixing** *stock*

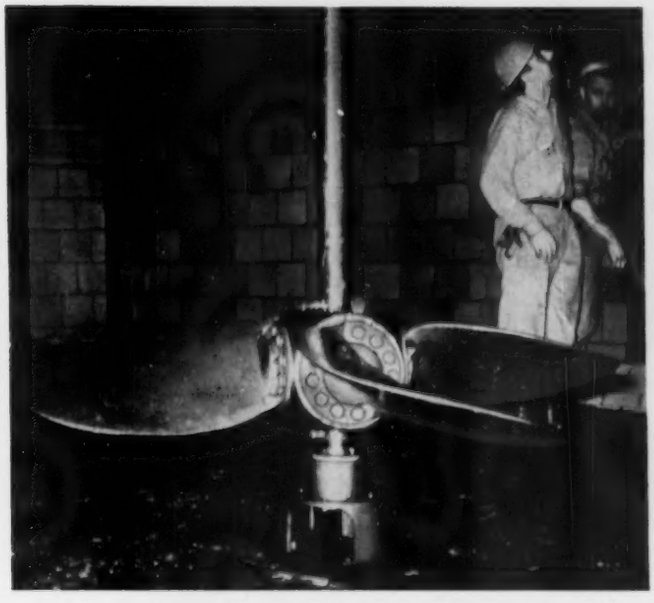


1. Familiar story? A large newsprint mill* was having a tough time getting a uniform 3½% feed of groundwood and sulfite from its mixed stock chest. The stock was churned with paddles on a horizontal shaft, in a chest 56′ long, 17′ wide, 16′ high. But the paddles were *sloshing* the stock instead of mixing it. This caused wide swings in consistency.

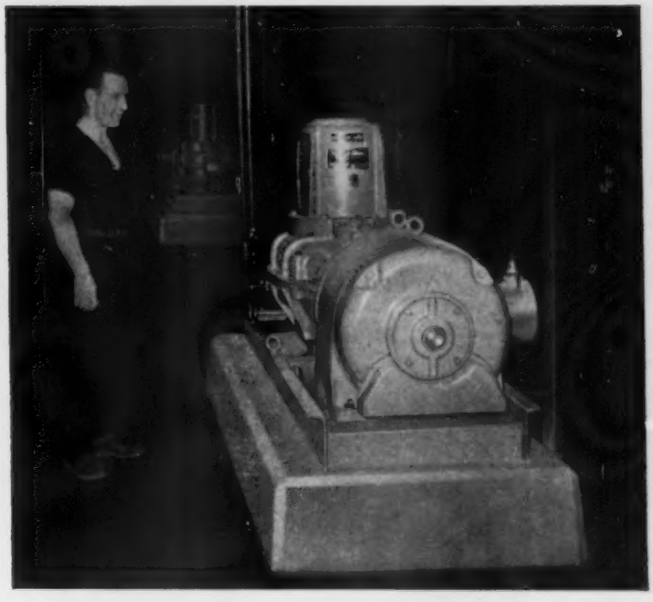
*Name on request



2. "Why put up with it?" said MIXCO engineers. "You can get *complete uniformity* with two LIGHTNIN Mixers that look like this. Every pound of stock will be thoroughly mixed from the instant it enters the chest. No dead areas—no stagnation—no stratification—no sudden ups and downs in consistency. What's more, we'll *guarantee* that LIGHTNINS do the job."



3. "Sounds good," said mill engineers, "but will we have to modify our chests to install these units?" "Not at all!" said the MIXCO men. "Make the whole change over one week-end. They come ready-assembled and aligned to minimize your down-time." Here's one of the two LIGHTNINS being installed. It drives a 54" stainless steel propeller with four adjustable blades.



4. Results? "Since installing LIGHTNINS we've repeatedly beaten our best previous daily production record," say mill engineers. "Effluent is so uniform that we're better off pumping directly to the machine, bypassing a machine chest entirely. Consistency of the stock varies *less than 0.2%* between any two points in the chest at any time!"

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- ☐ Portable: ⅛ to 3 HP (B-108)
- ☐ Condensed catalog showing all types (B-109)
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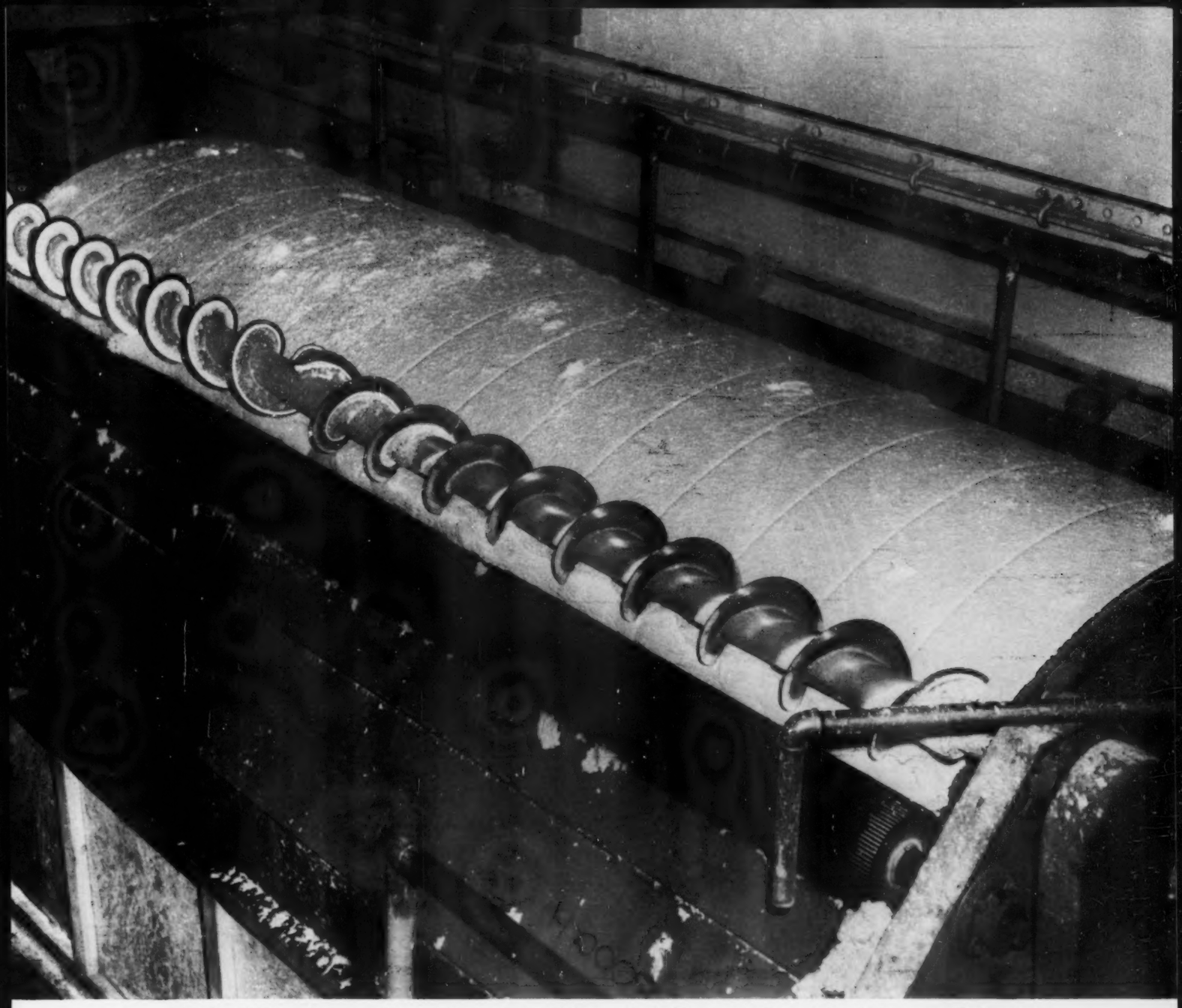

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Europe's Challenge:

The Common Market and proposed Free Trade Area offer profitable opportunity for the U.S. pulp and paper industry

BY PETER WARREN
Economist
The Champion Paper & Fibre Co.
Hamilton, O.

● The European Common Market has many implications for the United States pulp and paper industry. It will likely stimulate U. S. investments on the Continent, and American technical and management methods will certainly be in increased demand. New markets for U. S. papers will be developed. North American pulp will be needed in larger quantities than heretofore in the operation of European paper mills. And there is even the possibility that European papers will become more competitive in the American market.

ECM's potential effect in the United States is difficult to analyze. First of all, there will be a big demand for capital. European capital now invested in this country will return to Europe unless we can offer equally good returns. Secondly, there will be an upward pull in European wages, bringing the Continent's standard of living and wage costs closer to ours.

A Common Market will push trade with Russia and China. Already, West Germany is Communist China's' biggest customer outside the Communist sphere.

ECM means that protectionism and high tariffs are dead in the United States. If U. S. tariffs should go up, it is certain that Europe would retaliate. On the other hand, the entire Common Market will lower its external tariffs sharply were the U. S. to do so through the General Agreement on Tariffs and Trade (GATT).

Free Trade Area Production

The Common Market produces about 8,000,000 tons of paper and board, the United Kingdom 3,500,000, Scandinavia and Austria 5,000,000. Other nations in the Free Trade Area produce 1,000,000 tons. Common Market production therefore accounts for about 45% of the paper and board production in the potential Free Trade Area, the United Kingdom 21%, Scandinavia and Austria 28%, and all others 5%.

On the other hand, Scandinavia and Austria account for about 3,000,000 tons in export. At the same time, the ECM nations export only about 350,000 tons, the United Kingdom only 263,000. The other dozen countries in the Free Trade Area export very little.

Chemical pulp production in the Free Trade Area stands at 9,600,000 tons, mechanical pulp production at 4,600,000. More than 10,000,000 tons are produced in Scandinavia (including Finland) and 3,000,000 in the Common Market.

With Common Market nations producing 8,000,000 tons of paper and board and only 3,000,000 tons of pulp, pulp imports from Scandinavia and other sources are obviously necessary.

However, Europe's industry isn't entirely dependent on pulp as its only raw material. Wastepaper accounts for one third of the raw material used, and in the entire Free Trade Area some 3,500,000 tons are consumed; also, 1,000,000 tons of straw and esparto. Obviously, then, the Continent's need for imported wood pulp is not as great as it might seem.

Great Britain, on the other hand, produces only 83,000 tons pulp as contrasted to 3,500,000 tons of paper and board. Were Scandinavian and North American pulp sources to become unavailable, therefore, the wider Free Trade Area (outside the Common Market, Scandinavia and Austria) would be forced to obtain 4,000,000 tons of pulp and wastepaper.

Largest Mills Outside ECM

The Common Market has 1,200 paper mills. The average production is 6,000 tons per year. The United Kingdom has 200 mills with an average yearly output of 16,000 tons. In Scandinavia 250 mills produce an average of 17,000 tons. Therefore, in terms of mill size, the countries that would come in through the Free Trade Area are larger on the average than those in the Common Market.

Of the 10 largest paper mills in the potential Free Trade Area, only three

MR. WARREN, an economist with Champion Paper & Fibre for the past several years, was at one time a market analyst for Ford International. He is a graduate of Princeton University, where he majored in public and international affairs. Mr. Warren studied in Italy under a Fulbright Scholarship and for a time was an analyst for the International Research Assn.

are in the Common Market. The three largest are in Great Britain; three others are in Finland. The largest mill in the Common Market in is Germany. Sweden, the Netherlands and Italy each have one.

In the Common Market the scale of output varies widely. In the Netherlands 20 mills have an average production of 28,000 tons; Belgium's 28 mills average 14,000; Germany's 300 average 9,000; France's 300 average 8,000, and Italy's 500 average 2,000.

In Italy, with by far the largest number of mills, the six largest produce 50% of the output. The largest mill alone—Cartiere Burgo—accounts for 29%. Some 400 firms produce only one-third of the total. The implication is that the existence of mills like Burgo and Vita Mayer, as large as they are, hasn't put these 400 little mills out of business.

European Paper Booming

Fortunately for the reception of the Common Market, the paper industry has been expanding rapidly. Between 1956 and 1957, paper production in the Common Market countries increased by 600,000 tons. Pulp production increased by only 120,000 tons. The 600,000-ton expansion in one year, if at all typical, means that these nations can perhaps afford to expand a little more slowly and still get a good deal of paper from the outside. Europe wants to get cheap but good paper. The Scandinavians are more interested in producing paper and getting into the Common Market and Free Area on that basis. Scandi-

For Europe: Common Market or Free Trade Area?

The European Common Market is a reality. As a device to increase sales, lower prices and bring other economic advantages to the member nations, it has its implications for the United States pulp and paper industry.

The Common Market is principally a tariff arrangement, but it goes a long way beyond. Its members foresee a prosperous future in many respects. Right now the membership is comprised of Germany, France, Italy and the Benelux nations (Belgium, the Netherlands and Luxembourg). It also includes the French and Belgian colonies. These countries are by no means attempting to bring prosperity out of depression. During the past five years Europe has been extremely prosperous and has increased production and capital income at a rate at least equal to that of the United States.

On January 1 all the tariffs these countries had imposed on each other's goods were lowered 10%. At the same time they began work on their external tariffs. Some have high tariffs, some low. This gap will be closed on a given product until an arithmetic average is reached.

Tariff cuts are scheduled to come quickly. By 1962 the rate on each other's goods will be cut 25% and by 1966 will be slashed 50%.

Freedom of Investment

Aside from tariff reductions, there are a number of other important aspects of the Common Market agreement:

1. A national of any one of the member countries may invest or establish a business in any other.
2. Labor may move just as freely between any of the countries as U. S. workers now move between states.
3. A common agricultural policy reconciles French farmers, German farmers, Italian farmers.
4. In favor of 100% free enterprise, the Common Market has established courts to deal with price fixing, cartels, subsidiaries and dumping.
5. Payments for trade have been coordinated and labor relations, working conditions and wages harmonized. Equal payment for both sexes is guaranteed.
6. A fund is to be established that will aid workers in moving to new jobs, and a special investment bank for depressed areas is to be set up.
7. The French and Belgian colonies will be open to development by all six members.

Shift in the Wind

Creation of the Common Market resulted primarily from a renewed belief in capitalism and free enterprise. Prior to the war European businessmen looked to the government for help. They had cartels and relied on the government for contracts, subsidies and tariffs. The shift in the wind has been pronounced.

Europeans are convinced that the high standard of living in the U. S. revolves around the ability of American industry to produce for a giant internal market. The Common Market, they say, will have the same benefit.

Individually, European nations are no match for the international giants. Join western Europe together and you have a real counterweight to both the United States and Russia.

The Common Market is open to any country in the world. Representatives of the six members are planning a program of action to this end. They are negotiating with the United Kingdom and other non-members. In some quarters the opposition is strong.

The British Alternative

The Free Trade Area is as yet just an idea. It is thought of as a British alternative to merely joining the Common Market on ECM's own terms. There are nations in the potential Free Trade Area that are afraid to join the Common Market and equally afraid to stay out. Common Market countries have sought the support of the English. They have invited the membership of Scandinavia, Austria, Turkey, Greece, Switzerland, Portugal, Finland and Denmark.

The British hold commitments to the Commonwealth and couldn't cut tariffs toward Europe more so than to the empire. Thus England is caught in the middle and is proposing an alternate plan.

The Common Market and the Free Trade Area are the latest examples of efforts toward integration in Europe. The proposed Free Trade Area will include the 16 Marshall Plan countries plus Switzerland and possibly Finland. Members will reduce internal tariffs about 10% per year until eliminated altogether. Meanwhile, each member would be allowed to maintain tariffs toward the outside world.

navia only increased its paper production by 250,000 tons between 1956 and 1957, but it increased its pulp production by 500,000 tons. Therefore, it is working to meet the increase in demand in pulp for Europe.

The Common Market in 1957 imported 1,300,000 tons of paper, mainly from Scandinavia, and about 2,000,000 tons of pulp. Therefore, the paper imports already are more than half the pulp imports. The increase in imports in the Common Market between 1956 and 1957 was 250,000 tons of paper, just about equal to the increase in Scandinavia. In pulp, the increase was much slower, only 50,000 tons. In the wider Free Trade Area, Great Britain imports 1,250,000 tons of paper and 2,500,000 tons of pulp. There isn't much growth trend in imports in the Free Trade Area, but there is in the Common Market.

Markets for the future in the European paper industry are suggested by the fact that, whereas per capita consumption of paper in the United States is over 400 lbs. a year, it averages only about 100 lbs. in Europe. To bring Italian consumption to the German level would require 2,500,000 tons of additional capacity.

Pulp and Paper Tariffs

In general, Common Market external tariffs are to be reduced to an arithmetic mean. This will not be done for pulp and paper, since this industry's problems are too complicated. A special committee is to be organized to decide the tariff that will actually be levied against the outside world for pulp and paper. If it were to be done in the normal way (via an arithmetic mean), the result would be the admitting of mechanical and sulfite pulp duty-free. Unbleached sulfite and bleached pulp would have only a 3% rate like most semi-finished materials. Newsprint would have a 5% tariff, while other papers would approximate 16%, or just about the same as the U. S. average. The special arrangements that will have to be made are as yet undetermined.

The German pulp and paper trade association in 1956 welcomed the Common Market; this was prior to the Free Trade Area discussion. The Germans recognized the threat of Dutch competition in strawboard and French competition in cigaret papers. And they wanted external tariff protection against Scandinavia. According to official sources, manufacturers are officially and publicly enthusiastic about the Common Market—principally because the German government is supporting it.

Privately, however, they are not happy. They see the Common Market as a mere transition to the Free Trade Area. Once the Free Trade Area is established, they say, in comes Scandinavian paper and pulp. But, for the good of the whole, they will do their best to meet such competition. One result, according to German spokesmen, will be the introduction of continuous production to compete with Scandinavia.

The French viewpoint varies. One trade association maintains that French paper manufacturers will have to specialize. They will have to adopt market research, quality control and standardization to a greater extent than they have so far. They want the government to ensure capital for modernization, to help in securing raw materials and equipment. Since France proberbally has higher labor costs than most of Europe, manufacturers of pulp and paper insist that working conditions be harmonized as stipulated in the Common Market agreement. Labor costs in other countries, they say, should be brought to French levels.

Despite these fears, many French companies are investing and expanding. In France the general consensus fears a Common Market much less than it fears a Free Trade Area. The latter would mean a conflict between firms using imported pulp and those using French pulp. About half of the pulp used in France is domestic.

In Italy, Confidence in ECM

An Italian trade journal is confident about the Common Market but anticipates Scandinavian competition in a Free Trade Area. Italian sources hope that the Common Market will make possible capacity production. They even expect that some inefficient marginal firms will go out of business. A 50,000-ton newsprint mill is entering production near Trieste. Its cost was $9,000,000. It is automated, uses Finnish equipment and Finnish technical help and produces newsprint at 1,900 fpm. Had the Italians feared Scandinavian competition, this plant would have never been built.

Some 25% of Belgian paper production is now exported. This figure will increase under the Common Market. Belgium now exports about 50% of its paper to the Netherlands (in the Benelux Common Market agreement), although Dutch wages are much below those of Belgium. Thus the one drawback foreseen by the Belgians is that their wages will—under ECM—have to be raised to the French level.

The British Alternative

The British are openly antagonistic. They don't like being faced with a Common Market of from 150,000,000 to 175,000,000 people. They suggest the Free Trade Area as an alternative. A section of the British paper industry supports the government wholeheartedly. Ignoring the anti-cartel clause in the Common Market agreement, it foresees European cartels injuring the British paper business. They still remember the pre-war trade rivalry in pulp and paper.

A growing body of opinion in the British paper industry takes a positive approach. *The Economist* has presented an analysis of the effects of the Free Trade Area on British paper production. It declares that British printing and writing papers could compete with Sweden in the British market. One advantage is closeness to consumers. It is pointed out that British wages in the paper industry are actually lower than those in Sweden, that half of the British paper and pulp imports come from North America anyway. Newsprint constitutes 46% of imports and is already duty-free. *The Economist* says that Scandinavian pulp output is limited and cannot meet all the future demand for expansion. Therefore, it concludes that the Free Trade Area, as far as the British paper industry is concerned, may slow down British expansion, but it will not halt it.

The chairman of Spicers Ltd. sug-

1957 Paper and Board Production*

(In thousands of short tons)

	Tons	%
Common Market	8,009	46.0
West Germany	3,128	18.0
France	2,318	13.6
Italy	1,167	6.7
Benelux	1,396	8.0
Austria, Scandinavia (including Finland)	4,852	27.8
United Kingdom	3,712	21.1
Others (Denmark, Switzerland, Portugal, Ireland, Turkey, Greece)	834	4.8
Total Free Trade Area	17,407	100.00

Source: PULP & PAPER, 1958 World Review Number

gests that British capital should merge with Scandinavian pulp production. He also points out that Norway and Sweden have been running short of timber and thinks that American pulp prices will keep Scandinavian prices in line.

The Swedes point out that they export about 4,000,000 tons of pulp, which is no more than the current expansion plans for the paper industry in the Free Trade Area. Even if they could convert all this pulp into paper, they could not hope to replace the European paper industry. The Swedish minister of commerce argues against treating paper differently than other industrial products in Common Market and Free Trade Area arrangements. He says that the Swedish industry should not be penalized for efficiency. In Sweden pulp production has risen 40% in the post-war years, and paper production has doubled. Europe is taking the place of the United States as an outlet for Swedish pulp. The Swedes fear depression if they are not admitted to European integration one way or another. A Swedish banker suggests building container subsidiaries in Europe as an outlet for their own pulp. In other words, the Swedish argument is that in a rapidly expanding paper industry there is room for the Common Market producers, the British and the Scandinavians.

The Austrians, too, have an important pulp and paper industry. They must join the Free Trade Area in order to keep their customers in Western Europe. As a safeguard to their producers, they ask regulations which will restrict the export of Austrian pulpwood. The Swiss appear to oppose the Free Trade Area because they fear Scandinavian competition.

Implications for U. S.

The Common Market is coming into being at a time when the paper industry of the member countries is prosperous and, therefore, less reluctant to experiment with economic innovation. It is still problematical whether the Free Trade Area will also be inaugurated in 1959. If and when it does come into being, it will have a more drastic effect than the Common Market on all phases of the European paper industry. There do not seem to be implicit problems in the Free Trade Area that cannot be resolved to the satisfaction of the participants.

Much of the criticism of both Common Market and Free Trade Area represent negotiations for a more favorable bargaining position rather than bitter-end opposition.

In retrospect, we will probably recognize that many of the implications and benefits of the Common Market were not foreseen. At least, this has been true of Benelux, the Coal and Steel Community and GATT. The European paper industry is more vigorous than many Americans realize. Under the Common Market the small firms which have so far succeeded in meeting domestic competition will probably compete equally well. There is room for all but firms which are inherently marginal and inefficient.

It is expected that Europe will continue its sustained capital goods boom. There will be a great impetus toward modernization of plant and equipment. Among the other effects of the Common Market will be increased ability to sell paper to the Russian and Chinese markets, as steel is being sold there now. On the other hand, the Common Market will steadily increase its requirements of North American pulp. In addition, before many months have passed, American paper and pulp producers will probably begin to emulate their compatriots in other industries in their eagerness to acquire solid paper mill connections in the Common Market countries.

In the early years of Common Market operation per capita paper consumption will continue to rise in Europe at the rate of 5%-10% per year. A doubling of total production within the next 10 to 15 years is not unlikely. With economic unification, per capita consumption may reach as much as 200 lbs.

A Growing Interest in America

It is perhaps not too early to decide an attitude toward selling pulp to the Common Market countries on a comparatively large scale. We may expect that the Europeans will show even more interest than in the past in any outstanding developments we can share with them, whether in technical processes, sales and servicing methods, industrial relations, management development or market analysis.

As the French and Italian tariffs are gradually lowered, this may open a demand for certain types of papers. On the other hand, as American tariffs continue their downward trend, European producers will be increasingly interested in studying the possibility of utilizing the St. Lawrence Seaway to ship paper to the American Midwest. If the American price level continues the rise of recent years and if European finance ministers are able to maintain their recent price stability, the anticipated rise in European productivity should make the European paper industry more competitive in the American market. Price stability has never been more important to American paper producers than it is today.

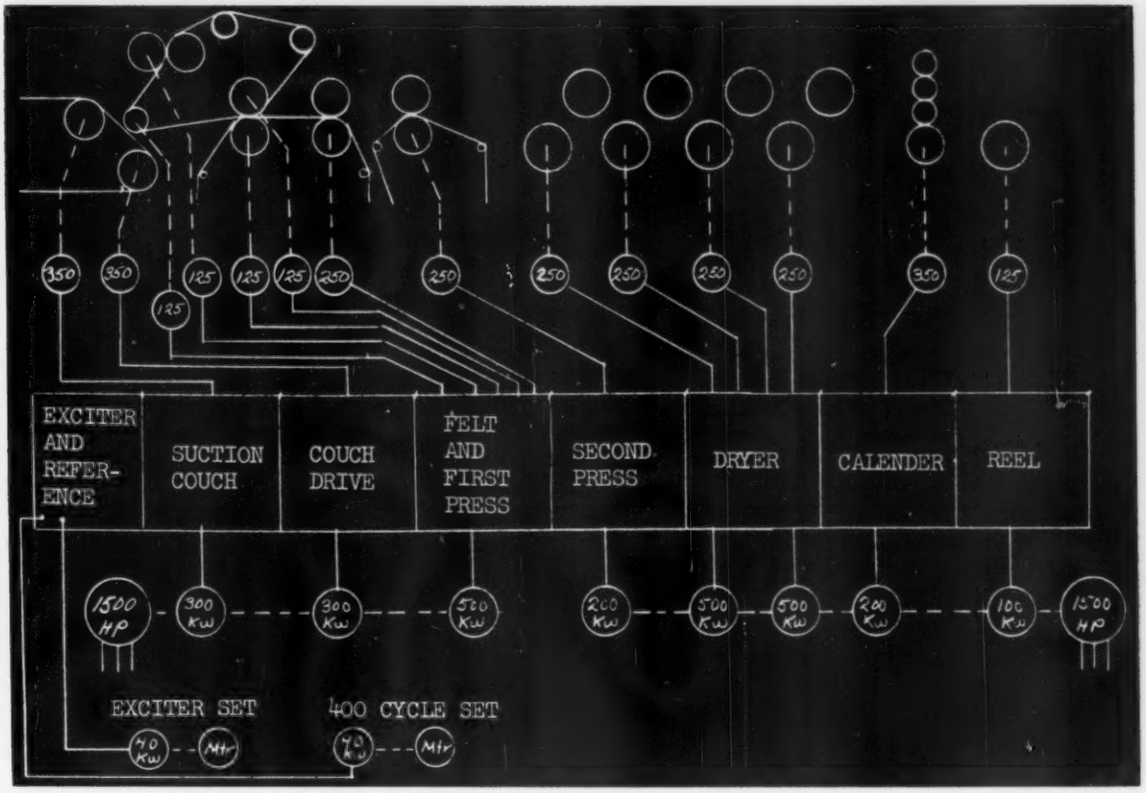
The Common Market has real meaning to the American paper industry. It can offer profitable opportunities—perhaps more so than in any other part of the world, or even in our own country. At the same time, we must study it in order to foresee consequences that may be painful to us.

International Flavor for Syracuse Cellulose Meeting

Scientists from throughout the world are expected to attend the second annual Cellulose Conference at the State University College of Forestry, Syracuse, N. Y., U. S. A. General chairman of the May 7-8 meeting is Dr. Jan J. Hermans, director of the Cellulose Research Institute at Syracuse.

Topics of the 12 scheduled reports range from "Borohydride Reduction of Pulps" to "Xanthation of Cellulose," and nearly half of the speakers will be visiting the United States from overseas.

Among those who will present papers at the conference are J. K. N. Jones of Queens Univ., Kingston, Ont., Canada; I. Jullander of Mo och Domsjo Ltd., Ornskoldsvik, Sweden; H. Sihtola of the Finnish Pulp & Paper Research Institute, Helsinki, Finland; T. E. Timell of the Pulp & Paper Research Institute of Canada, Montreal, Canada; D. Vermaas of N. V. Onderzoekings Instituut Research AKU, Arnhem, the Netherlands; G. Hebblethwaite, R. F. Schwenker Jr. and E Pacsu of the Textile Research Intitute, Princeton, N. J., U. S. A.; C. Y. Liang and R. H. Marchessault of American Viscose Corp., Marcus Hook, Pa., U. S. A.; Bengt G. Ronby, director of the Empire State Paper Research Institute and professor of pulp and paper technology at the State Univ. College of Forestry, Syracuse, N. Y., U. S. A.; K. Ward Jr. of the Institute of Paper Chemistry, Appleton, Wis., U. S. A.; Edwin W. Abrahamson, also of the State Univ. College of Forestry, Syracuse; C. M. Conrad of the Plant Fibers Pioneering Research Laboratory, New Orleans, La., U. S. A., and Nicholas E. Geacintov of the Cellulose Research Institute, Syracuse.



GENERAL PHYSICAL ARRANGEMENT shows how generators are divided into two generator sets and have minimum number of ratings for flexibility in maintenance and ease of operation.

Exclusive PULP & PAPER report on transistor amplistat system

Southland's Ultra-Modern Drive

. . . was developed by General Electric to reduce maintenance, provide faster response and produce the ultimate in accuracy

By WILLIAM F. DIEHL JR.
Southern Editor, PULP & PAPER

● Since the first roll came off its machine in January 1940, Southland Paper Mills Inc. of Lufkin, Texas, has been a pioneer in the manufacture of newsprint from Southern pine.

Nor has Southland slowed in its rapid growth since then. In August 1957 PULP & PAPER featured an inside look at the company's recently-completed $15,000,000 expansion program. The project included the mill's third machine ("The Newsprint Gamble that Paid Off," August 1957, p. 46). Now Southland"s fourth and most advanced machine is on the line.

Big feature of No. 4 is the transistor amplistat-regulated sectional drive designed for this installation by General Electric Co. It is one of the first of its type installed on any machine anywhere.

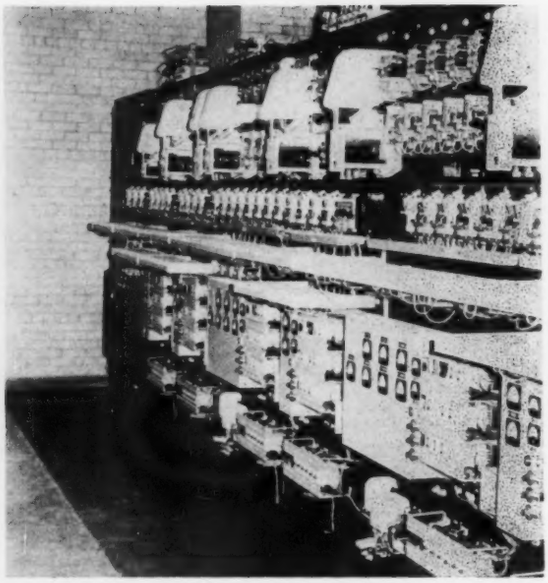
The drive is used to turn the 270-in. Pusey & Jones Corp. Fourdrinier, recently completed at a cost of $3,000,000. With a design speed of 2500 fpm, the unit has a 118-ft. wire, 34-in. dia. breast roll, 17-in. table rolls, 10 suction boxes, a 44-in. suction couch roll and a 38-in. dia. couch drive roll. Enclosed in a Ross hood, the 400-ft. machine is equipped with an air pressure type headbox and slice and cross-flow stock distributor. Also featured is a quick-change Rapi-Drape system for switching wires.

It is no secret that the history of progress made in the industry closely parallels the combined efforts of paper mills and equipment manufacturers to constantly improve production machinery. This is particularly true in regard to the drives for Fourdrinier machines, which get bigger and bigger with each installation.

Not An Overnight Development

Early sectional drives of the '20s

SECTIONAL DRIVE MOTORS are kept to a minimum with three 350-hp motors, six 250-hp motors and four 125-hp motors in the drive. All are conventional splash-proof forced-ventilation types.



PROVIDING REGULATED POWER for the pre-amplifiers and regulated 400-cycle power for the power amplifiers are these open section panels on No. 4 machine at Southland. Shown here: the master reference panel.

were extremely crude. But, then, they were only required to provide equal or slightly better performance than existing mechanical drives, which were difficult to maintain, dangerous to personnel and limited in capacity. One of the first electrical sectional drives was installed at Crown Willamette Paper Co., now Crown Zellerbach Corp's West Linn., Ore. div. Synchronous motors were connected to the d.c. motor shafts through cone pulleys and belts. These provided the means for synchronization. Bulk of the driving power came from large slow-speed d.c. motors.

This "brute force" machine of the '20's was superseded by a mechanical computer type rheostat position-regulating system, which was in turn replaced in the '30s by a position-regulating system utilizing a master selsyn transmitter with belt-driven selsyns on each section and differential selsyns operating carbon pile resistors in the motor field circuits. This was significant because by a specialized cam arrangement the sensitivity of this system could be maintained over a fairly wide range of machine speeds.

Prelude to the Transistor Amplistat

By the late '30s and early '40s these regulating systems were reaching the limit of their performance capabilities, so it became necessary to find a system providing faster response with essentially the same regulating accuracy.

The result: high-gain, speed-regulated systems that, provided greatly improved transient performance with more than adequate steady state performance. Tried experimentally in 1940 and 1941 by General Electric, this was the electronic amplidyne speed-regulating system that has been in use for the past 10 years. It includes a high-accuracy reference system, d.c. tachometer generator feedback system, an electronic amplifier and an amplidyne generator operating in either the motor or the generator field circuits. Between 1946 and 1958 more than 100 such drives were installed representing more than 1000 individual regulating sections.

Based on this system, in terms of equipment availability and machine lost-time chargeable to drive performance, drives were averaging well under 2 min. per day. From an operator standpoint it was easy to use. Still, technical advances put the squeeze on for something even better. In 1945 G.E. began a study program aimed at further reduction of drive maintenance. The result of this study was the development of a high-accuracy transistor amplistat speed-regulating system with performance to equal the electronic amplidyne system.

Some of System's Features

1. **Circuit Design**—This represented the major portion of the design and development work. It was necessary to have minimum system drift (from temperature or other causes), adequate system loop gain for system regulation and high-impedance input circuitry (to impose zero loading on the high-accuracy d.c. tachometer speed-sensing element). A final circuit arrangement was selected on the basis of overall simplicity and a minimum of components that might require maintenance or replacement.

2. **Drift-Free Amplification**—This represented a major design problem since it required low-level, high-source impedance. The final design uses a.c. amplification of the input signal to convert the initial low-level high-impedance signal into a higher level low-impedance signal. Also, it no longer represents a problem from a temperature drift standpoint.

3. **Corrosion Conditions**—Because corrosion represents a major problem in a paper mill, it was desirable to isolate all small components from the mill atmosphere and also have the potted sub-sections of such size as to be reasonable in replacement costs. The preamplifier circuit, therefore, was divided into modules (each a complete sub-system), which were then potted for component protection. The module interconnections are high-pressure line contact connectors that have a proven history of good contact under corrosive conditions.

The Transistor Amplistat

Southland's No. 4 machine drive (including motors, gears, generators and controls) is designed for 1000 to

2700 fpm on 32-lb. basis weight newsprint. The speed is continuously adjustable from a dead stop through 2700 fpm from the operator's control console on the tending side. Careful considerations was given to each item of the drive, including the selection of what is considered to be the ultimate in "paper mill type brushes" for the drive motors and generators. Important factors that were considered: flexibility, reduced maintenance, reduced downtime chargeable to electrical repairs and adjustments.

The sectional drive meeting the necessary requirements is a G.E. drive using transistorized preamplifiers and amplistat (self-saturating magnetic amplifier) power amplifiers. Eliminated: as many moving parts as possible within the regulating loop, as well as vacuum tubes, thyatrons and other possible trouble sources. A static amplifier was selected over other more conventional regulating systems.

Generators for the drive were divided into two motor-generator sets, each with 1500-hp synchronous motors. For flexibility in maintenance and to make provision for spares, a minimum number of ratings was used: three 500-kw, three 300-kw, one 200-kw and one 100-kw. The generator positions on the lineshaft of the MG set are in the same sequence as their respective paper machine sections with the exception of the second press generator, which was mounted on the dry end MG to balance the loads on two sets. Provision was also made for mounting and driving a spare generator from the wet end MG set.

Sectional drive motors were also kept to a minimum. There are three 350-hp motors, six 250-hp motors and four 125-hp motors in the drive, all of them conventional splashproof forced-ventilation types. Permanent magnet-excited tachometer generators provide speed signals for the regulating system and the speed and draw indicators on the machine.

How Sections are Regulated

The over-all drive section has six speed-regulated sections—couch drive roll, first press, second press, dryer, calender and reel. The suction couch drive is also regulated to follow the couch drive roll,—the amount of load on the suction couch drive determined by the amount of vacuum in the couch roll. The suction pickup roll, wringer roll, top transfer press and bottom transfer press drives are helper motors operating in parallel with the first press, their operating loads adjusted by motor field rheostats.

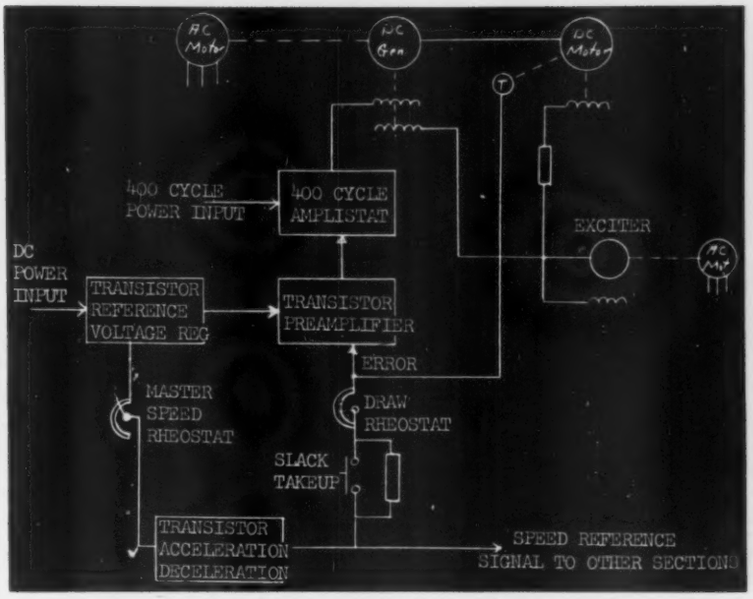
A rate amplifier, mounted on the reference panel, provides a definite rate of acceleration and deceleration when the speed of the machine is changed. Both acceleration and deceleration rates are independently adjustable. The rate amplifier output is the reference for all section speed regulators. This common reference is fed to each of the speed regulators (except the dryer regulators) through individual helipots for draw adjustments.

The regulator panels of the machine, mounted on the front of each section panel, have no moving parts except for the sealed Stevens-Arnold 6-volt, 60-cycle chopper used in the first stage of the regulator. These regulator panels are identical regardless of the section to be regulated. Each section panel is also arranged with essentially identical circuitry permitting maintenance personnel to readily become familiar with the relay sequencing and basic adjustments.

The basic instruments used in setting up and maintaining this regulating system are a photoelectric recorder for accurate, fast-response recording of the section speed and a standard cathode ray oscilloscope for checking the regulator performance.

Facts on Nine Months Operation

Southland's No. 4 machine started up in October 1959 with no drive operating problems. Based on the history of its first nine months of operation, it appears that the transistor amplistat regulator will live up to its promise. To date, there have been only a few minor problems. After several weeks of operation, for instance, a 50-amp silicon rectifier burned out, but the trouble was traced, and it was rectified in minimum time. On another occasion erratic performance was traced to loose connections. This has been the extent of "startup" problems.



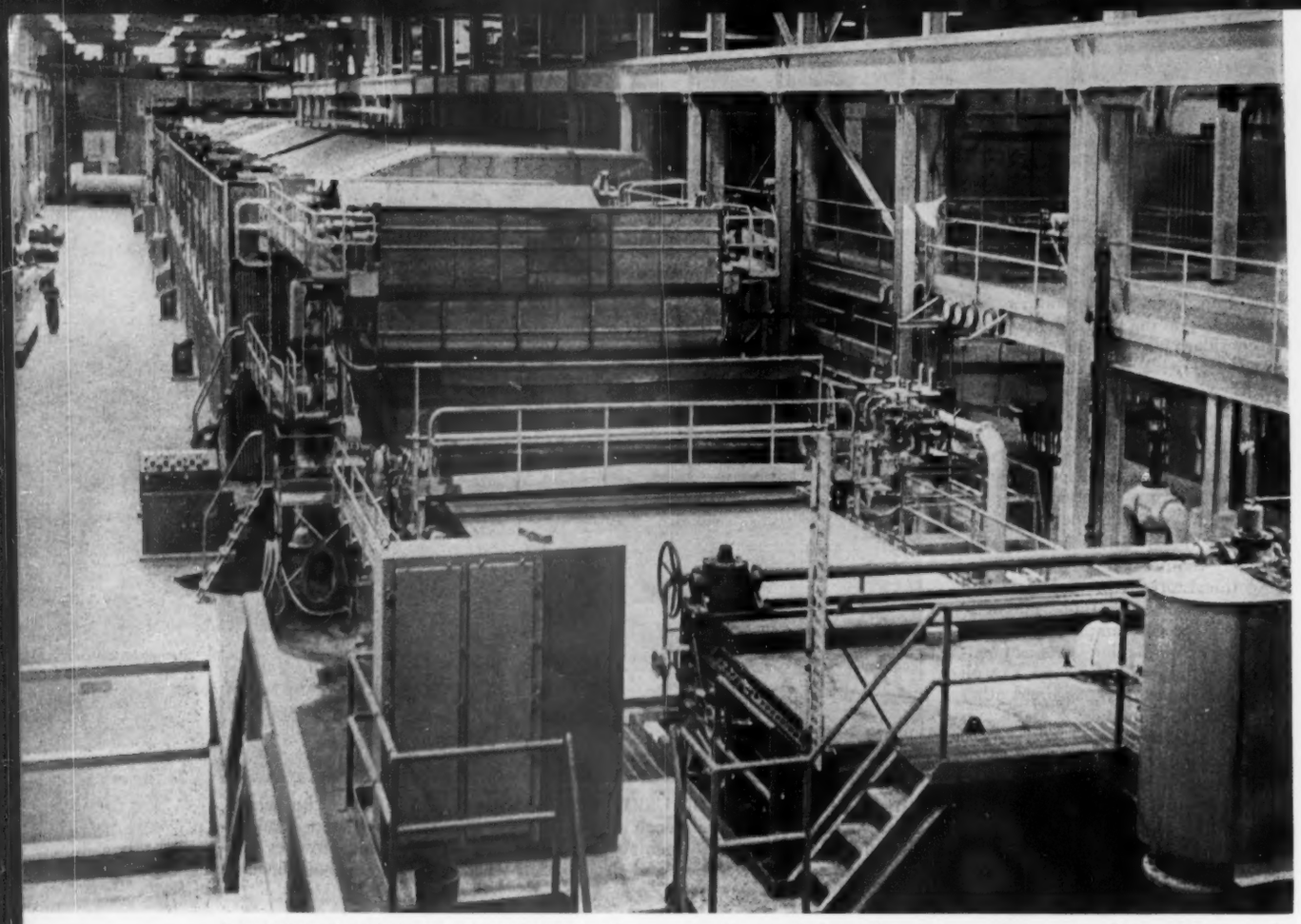
FINAL CIRCUIT DESIGN USED WITH THE DRIVE SYSTEM at Southland, where a master speed reference supply provides stiff reference voltage adjustable over the full-range machine speed. Linear timing circuit provides controlled rates of acceleration and deceleration when changing over-all machine speeds.

Major Expansion for Pennsalt Under Way in Portland, Ore.

Major expansions of Pennsalt Chemicals Corp. production facilities at Portland, Ore., scheduled for completion late this year, will increase the firm's capacity for supplying the chemical needs of industry, agriculture, and the fast-growing missile field. The production of ammonium perchlorate and sodium chlorate will be upped materially as result of the current project.

Pennsalt was the second plant in the nation—the first financed by private capital—to commercially produce ammonium perchlorate for missile propellants. It is being enlarged.

The sodium chlorate plant, which provides the basic raw material for making ammonium perchlorate, is being expanded by 25%. This also equips Pennsalt to better meet anticipated expansion of bleached pulp production of the West Coast and use of sodium chlorate in forest management.



WET END OF NEW NO. 11 MACHINE at International Paper Co's Hudson River mill has Fourdrinier 208 in. wide, 124 ft. long.

IP's On-Machine Coater

Changeover at Hudson River mill, Corinth, N.Y., from 100% newsprint in 1929 to full-time on-machine-coated publication grades

• The addition of No. 11 machine and the complete changeover of International Paper Co.'s Corinth, N.Y., mill to magazine coated paper comes at a time when forecasts are for revolutionary growth in coating and increases of close to 300,000 tons every five years, for many years ahead, of this coated book paper grade alone.

With No. 11 added to its on-the-machine coating roster, International Paper now has four such machines at its Hudson River mill at Corinth, N.Y., some 50 miles north of Albany. Total coated paper production is over 500 tpd of 35-lb. (25 by 38/500) to 80-lb.

Grades produced at Corinth include Hudson Gloss and Publication Gloss for letterpress and rotogravure printing. Hudson River customers include many of the large magazine publications.

The Hudson River mill is one of the original mills that came together in 1898 to form International Paper Co. The mill draws some 120,000 cords of pulpwood a year from 400,000 acres in New York, Vermont and Maine, plus a considerable volume of farmer wood from areas adjacent to the mill.

There are six mills with 27 Fourdriniers comprising IP's Northern Division. They are the Hudson River mill at Corinth; Otis at Livermore Falls, Me.; Niagara Falls at Niagara Falls, N.Y.; Tonawanda at Tonawanda, N.Y.; Ticonderoga at Ticonderoga, N.Y., and York Haven at York Haven, Pa. Hudson River is the only mill in this division making machine coated papers.

Once the decision to build No. 11 was made, IP launched a crash program to get it into production. A major problem was that the site for the new mill turned out to be solid rock. This cliff virtually had to be blasted out of the way. Construction work began in August 1956 around two existing machines. No. 11 was turned over in April 1958, went into production in May.

No. 11 machine has a 208-in. Fourdrinier wire 124 ft. long designed to operate at speeds of up to 2300 fpm. Stock is fed to the wire through a

pressurized headbox. Five rectifier rolls insure even flow to the slice. In order to maintain constant level, air pressure in the headbox is supplied by a motor-driven Nash air compressor. The Fourdrinier is removable as a unit with all table rolls, inside wire rolls, savealls and suction boxes for fast wire changing.

A 32-in. centrifugally-cast bronze breast roll together with a stainless steel forming board with micarta lips are mounted on movable arms on the Fourdrinier. This equipment is lowered by an air-operated motor during a wire changing operation.

The 24 table rolls are of two types: 18 plain face 12½-in. dia. rolls made of aluminum tubing covered with 3/16-in. hard rubber, and six grooved-face 13¾-in. dia. aluminum tubing rolls covered with ½-in. rubber with the rubber grooved circumferentially.

There are six stainless steel oscillating suction boxes with Emerson type covers. Two 12-in. wide boxes are located ahead of the 30-in. center-mounted dandy roll and one 12-in. and three 8-in. wide boxes after the dandy.

The 36-in. suction couch roll, with 8-in. wide internal box opening, and a 32-in. wire turning roll are mounted on cantilever stands with extended back journals and jack stands for use in wire changing.

Press Section—Twinver Press Used

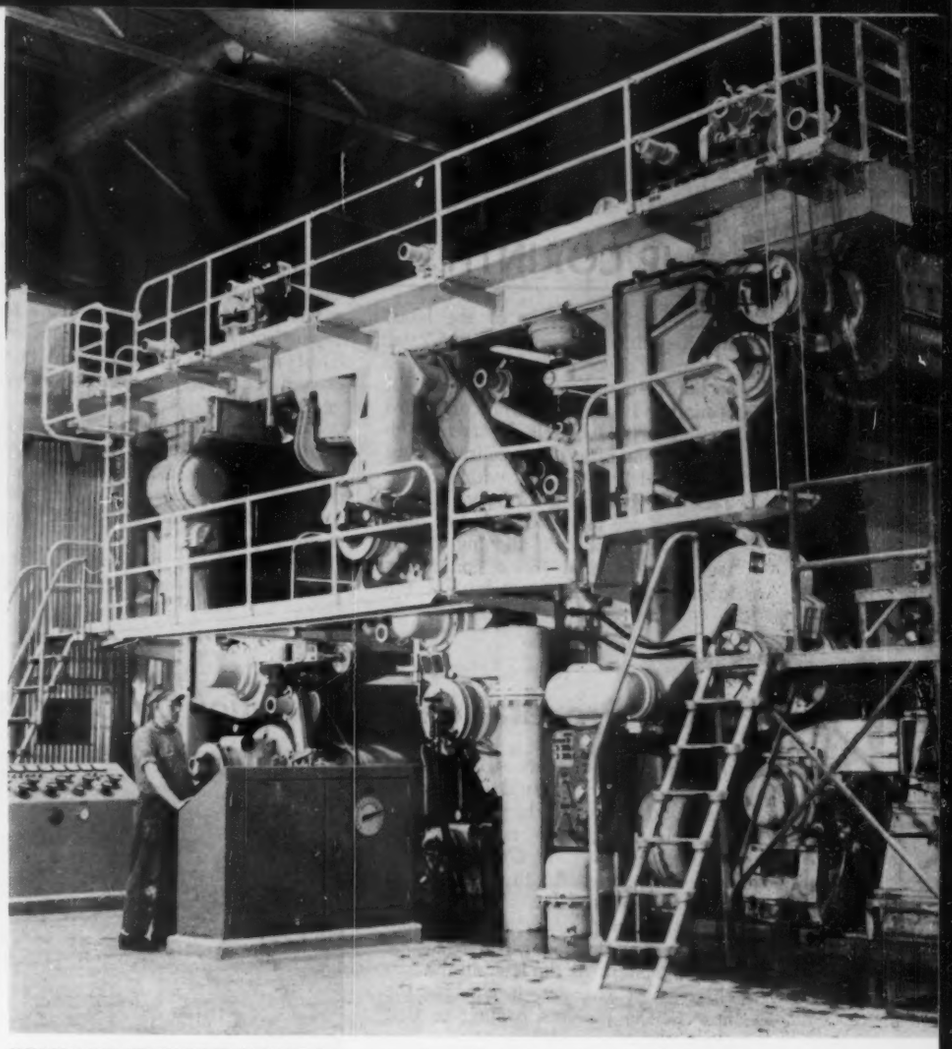
The press section has a 26-in. suction pick up roll with a 216-in. drilled face, a 20-in. felt roll, three 38-in. rubber covered suction press rolls, two 40-in. granite rolls. Of the latter, one is located on the center roll for the first two presses and on the top roll for the third press.

In the operation of the Twinver press the web is picked up from the wire by a suction pick-up roll and enters the first press nip of the Twinver. Here the pick-up felt acts as a wet felt for water removal. The sheet is then transferred to the 40-in. dia. center roll and passes through the second press nip, an inverse press. The web is then drawn down and led into the third press over a paper roll.

Felt cleaning is accomplished with a 26-in. bronze suction wringer roll and a 28-in. rubber-covered roll for the press pick up felt and Vickery felt conditioners of the latest traveling header type designed for second and third press felts. Vacuum for the press and Fourdrinier sections is furnished by nine Nash vacuum pumps requiring a total of 1,700 hp.

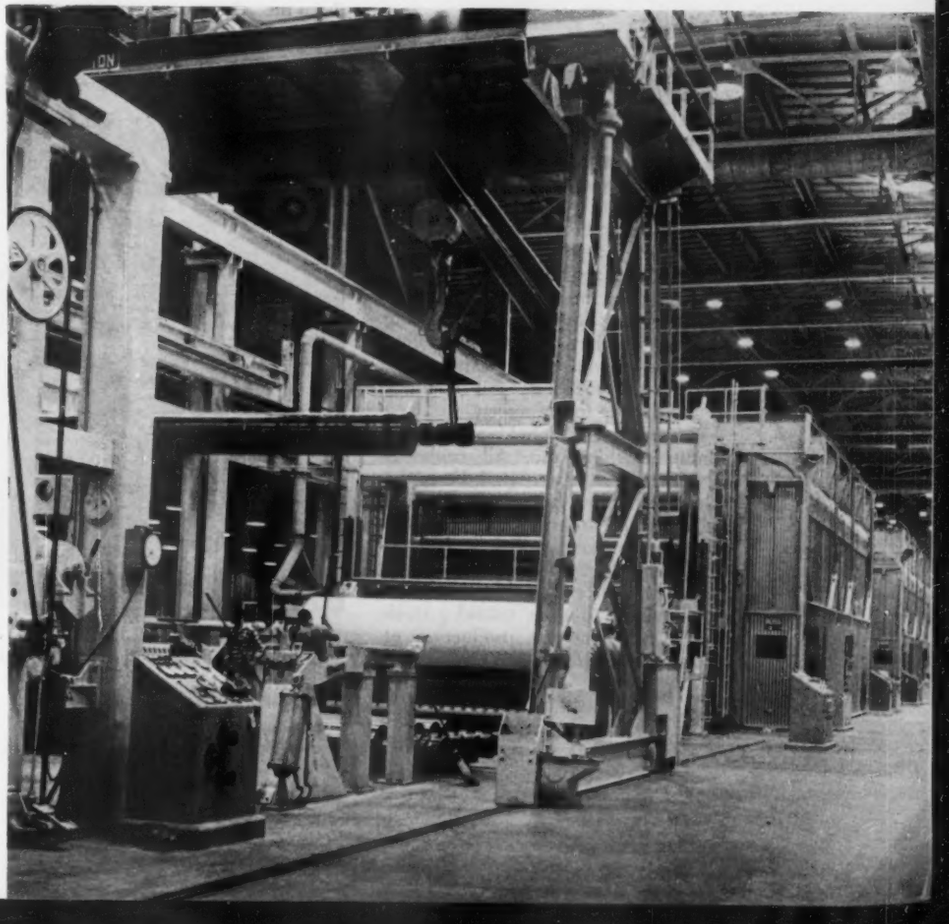
Dryer Section Completely Enclosed

The dryer sections comprise 55 paper dryers and 8 felt dryers; all are



COMPACT TWINVER PRESS has aroused much interest. It is a dual press with a single backing roll.

COMPLETELY ENCLOSED DRYER SECTION with J. O. Ross hood has 55 paper dryers and 8 felt dryers mounted in heavy duty SKF spherical self-aligning roller bearings.



IP CORINTH

60-in. by 208-in. face of the latest Beloit design to operate up to 75 psi. The main dryer is divided into three sections, 13 paper dryers in the first section and 14 in the second and third sections with two felt dryers in each section. The after dryer consists of 14 paper and 2 felt dryers with a 36-in. Teflon covered lead in dryer.

Dryers are mounted in heavy duty SKF spherical self-aligning roller bearings designed for a continuous lubricating system by Beloit, of the roll filter centralized type. The back bearings are mounted on enclosed gear cases and the front bearings on special rocker type mountings to provide for expansion, all supported by Beloit's latest box type frames with back frames designed to enclose dryer gearing.

Each dryer is provided with Beloit high speed condensate remover and duplex balanced steamfit with carbon discs and seals suitable for operation from 10-in. vacuum to 75 lbs. max. steam pressure.

Dryer drainage was provided by Ross Midwest Fulton, designed so that each section has a separate system.

Rope carrier system is provided to carry the leading edge of the sheet from third press through main dryer sections, coater and after dryer, with a short carrier rope at the reel.

Both the main and the after dryer sections are completely enclosed by a J. O. Ross Engineering Corp. hood. The basement portion having horizontal sliding doors both front and back and the machine floor portion provided with automatic vertical slide doors operated by electric eye as well as push button controls on the front side.

Stock Preparation Is Continuous, Automatic

Five stocks, groundwood, bleached sulfite, unbleached sulfite, bleached kraft and broke are blended proportionately and continuously by a Foxboro metering system. Groundwood is the governing stock. Five controlling meters control the five different stocks.

The flow of groundwood is governed by the flow in the pipeline to the machine chest. As the level in the machine chest changes, it changes the flow in the pipeline coming to that chest.

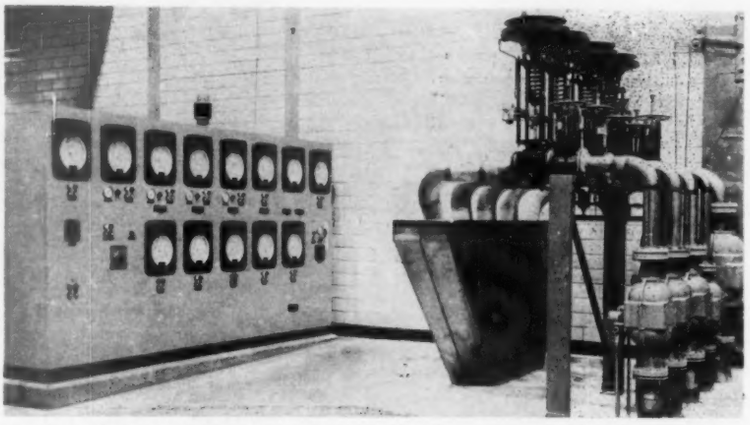
The Lapp Pulsafeeders are automatically tied in to the stock preparation system, add color and chemicals to the furnish. From the blending chest with a 10-minute machine run capacity, furnish is then cleaned and deaerated in the Vorvac system.

The Vorvac system comprises 13 primary Vorvacs, 6 secondary Vorjects and one tertiary Vorject with a total capacity of 16,000 gpm. Metered stock is introduced to the suction of a pump and pumped to the inlet of the Vorvacs at 15 psi. Accepted stock under 20-in. vacuum is introduced to the suction of a second pump and pumped to the 6 Selectifier screens.

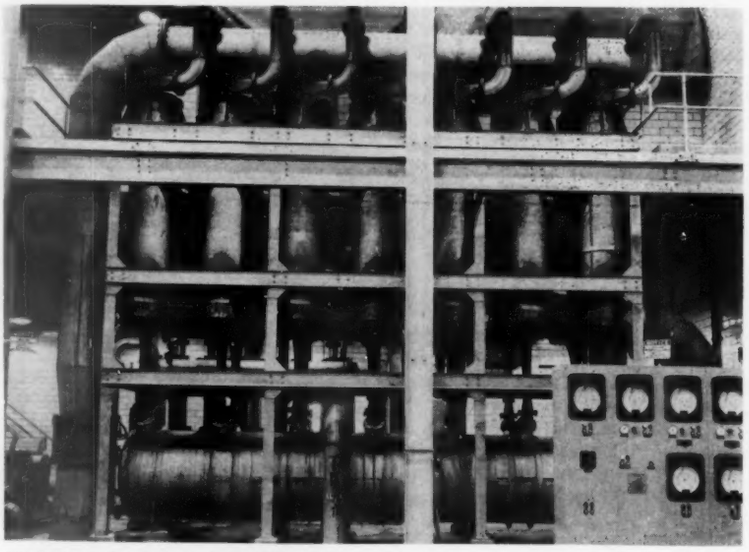
Air operated valves and instrumentation on the accepted and recirculation system of the Vorvacs and on the separator tank and white water line to the secondary make the system completely automatic. To adjust stock flow to the machine, the operator adjusts a valve to the screen.

The machine chest holds about a 30-minute machine run. All broke is mixed, coated and uncoated. From the Selectifiers, stock is pumped through an Ingersoll-Rand fan pump to the pressure headbox.

A Dorr-Oliver disc saveall takes squirt and wet end broke. Two Duopulpers beneath each calender stack handle full machine production of broke when needed.

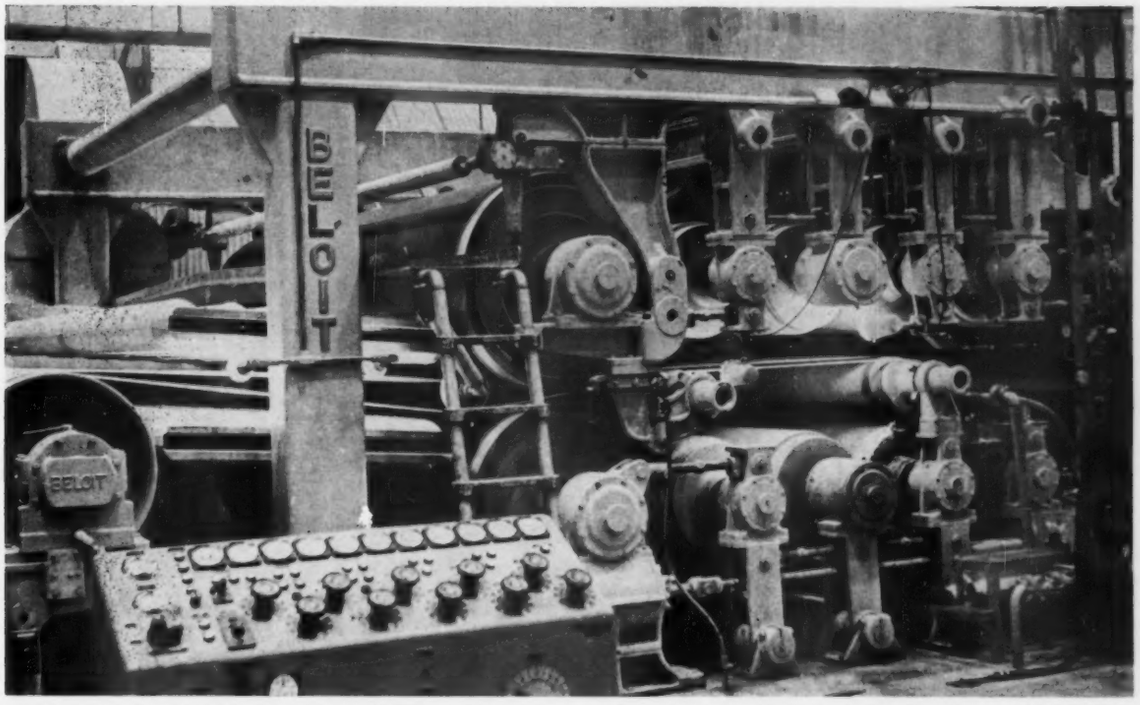


STOCK PREPARATION IS CONTROLLED from Foxboro panel at left. Foxboro metering system at right controls blending and proportioning of five stocks.



VORVAC STOCK CLEANING SYSTEM. Primary section is shown in foreground; secondary section is at rear and tertiary section is at left rear.

Consolidated Coater Is Cradled in Dryers



HIGH SPEED CONSOLIDATED COATER on IP's No. 11 machine has already exceeded 1,500 fpm, is designed for top speed of 2,300 fpm.

Cradled among No. 11 machine's dryers is the Consolidated coater, designed to operate at a top speed of 2,300 fpm. It has already exceeded 1,500 fpm. An interesting observation on this coater is that it further dispels the myth that the Consolidated coater is limited to 1,000 fpm. Somehow this fallacy was introduced into coating industry literature, has been picked up time and again. This limit, if it ever did exist, is gone with the wind. If there is any limit to the Consolidated coater, it is not known.

From the coater, the sheet passes through a Ross coater air dryer setting the surface of the coating before it enters the after dryers, keeping the dryers free of picking. The first roll in the after dryers is also Teflon coated.

New coating facilities were added to existing equipment to handle No. 11 machine's requirements. International Paper uses what has been called a "slurry in-a-hurry" system. A Fuller Airveyor system unloads clay from cars to the slurry tanks where the wet slurry is agitated for about 24 hours before use. Storage capacity can hold up to 2,000 tons of dry clay.

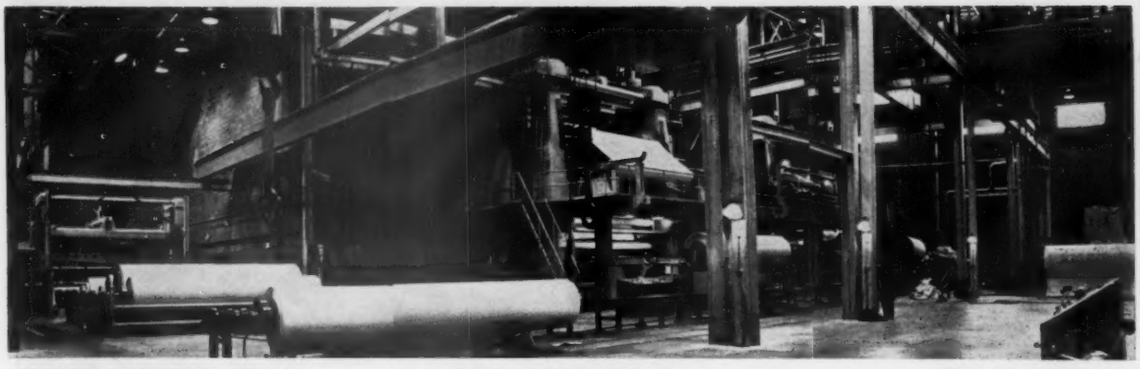
A batch system is used to prepare coating color. This system has worked well, so IP stayed with it when adding new capacity. Coating color is about 71% solids with about 15 to 18 parts adhesives.

Operating Heads of Corinth Mill Pose by New Machine

(Left to right) Albert Oetken, technical supt. and supt. of coating preparation, D. C. Lincoln, general supt., O. V. Simmons, plant engineer, O. B. Beyer, mill manager, Jud Hannigan, asst. mill manager, and G. A. Rogers, asst. to gen. supt.

IP CORINTH

Roll Handling Is Highly Instrumented

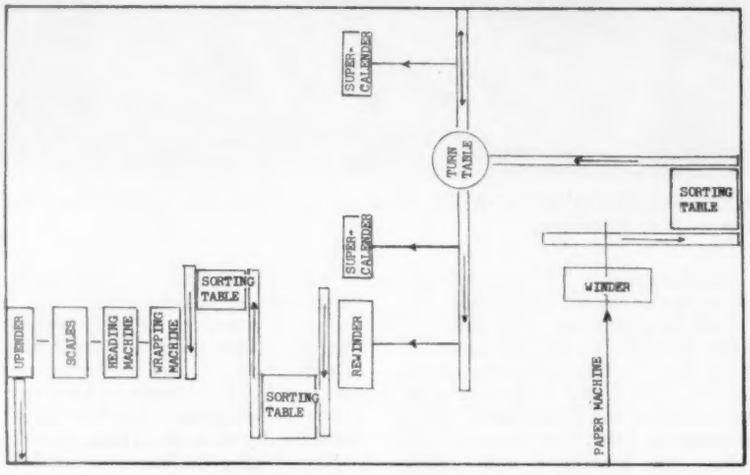


PUSH BUTTONS, CONVEYORS AND TURNTABLE MOVE ROLLS from the machine to either supercalenders and/or winder. Pictures (above) and flow chart (below) show how system works.

Push buttons, conveyors and a turntable move rolls from the machine winder to either the supercalenders and/or the rewinder. The operator makes his selection from a control board at the supercalenders before the roll leaves the sorting table at the winder. Roll transfer from conveyor to supercalenders is by an overhead crane at each stack.

The supercalenders are designed for 2,000 fpm operation, 193-in. sheet width and 88-in. diameter rolls. Each has a 46-in. dia., 196-in. face bottom roll and a 36-in. dia. top roll; three 16-in. dia. intermediate bored rolls, all Farreloy chilled iron. There are also five 24¼-in. dia. cotton-filled rolls.

The rewinder rolls along at a top speed of 6,000 fpm, takes rolls up to 72-in. dia. Of double-drum type, it has two 24-in. drum rolls, motor driven rider roll, eight motor driven slitter assemblies and winder shaft for 3-in. dia. cores with roll ejector and shaft puller.



Push buttons control progress of rolls throughout the roll finishing system. Here rolls are wrapped, "headed," weighed, raised on end by an upender and moved on an automatic belt to the shipping platform and then from there loaded onto cars by electric truck.

PRINCIPAL SUPPLIERS

Prime contractor	Walsh Construction Co.
Agitators, Selectifier screens, Duo-Pulpers	Black-Clawson Co.
Complete paper machine, machine coater supercalenders, rewinder, machine drive	Beloit Iron Works
Steam turbine, electrical control centers	General Electric Co.
Supercalender drive	Reliance Electric & Eng. Co.
Consistency regulators	De Zurik Corp.
Stock cleaning and deareating system	Nichols Engineering & Research Corp.
American (disc-type) saveall	Dorr-Oliver, Inc.
Vickery felt conditioners, Jonsson screen	Bird Machine Co.
Vacuum pumps	Nash Engineering Corp.
Pumps	Ingersoll-Rand, Robbins & Meyers, Gardner-Denver, Bingham Pump, Lapp Insulator Co., Aurora Pump
Dryer drainage	Ross Midwest Fulton
Dryer hood (totally enclosed), heating and ventilating	J. O. Ross Engineering
Cranes	Whiting Corp.
Conveyors, swing table, roll wrapper, header, up-ender	Lambs-Gray Harbor Co.
Stock chests	Stebbins Eng. & Mfg.
Roll grinder	Farrel-Birmingham
Suction box grinder	Eastwood-Nealey
Lathe	Simmons Machine Tool
Tanks	Douglas Brothers, Ltd.
Starch cooker	J. H. Day Co.
Instrumentation	Foxboro, Minneapolis-Honeywell, Worthington, Mason-Neilan, Conoflow; Brooks Rotameter

Nine Advantages of Magnefite Confirmed in Mill Run

1. **Use of wood species not previously found suitable for sulfite pulping.**
2. **Increased digester room capacity due to shorter cooking time.**
3. **Increased pulp yield.**
4. **Increased pulp strength.**
5. **Decreased dirt content of pulp.**
6. **Elimination of digester heater and piping scaling.**
7. **Minimization of nuisance of sulfur dioxide odors, particularly in the event of leaks, blown gaskets, etc., and in the blow pit room.**
8. **Use of hot water for acid making with elimination of need for refrigeration.**
9. **Simpler storage requirements of acid at elevated temperatures due to reduced pressure at given temperature.**

Mill Run for New Process

. . . proves Magnefite pulp, attracting worldwide interest, is a success.

Will keep North America's oldest sulfite mill running many years.

BY L. T. WELCH, T. G. SHERIDAN and G. H. TOMLINSON II
Howard Smith Paper Mills Ltd., Cornwall, Ontario, Canada
(Prepared especially for publication in this magazine)

● Extensive laboratory studies indicated the possibility of modifying the acid magnesium bisulfite process to allow its use for pulping pine and other woods not normally considered suitable for the sulfite process. At the same time there were indications that improved yield and strength in the resultant pulp could be obtained. This modification involved the use of a magnesium bisulfite solution, essentially free of the excess SO_2 characteristic of the acid sulfite process, and a relatively high-temperature digestion. The rate of pulping and the yield at given permanganate number were improved by using a quantity of combined SO_2 somewhat greater than that used with acid sulfite pulping. Because of the recovery features possible with magnesium base[1] this would involve only a relatively small increase in the cost of make-up chemical.

Initial laboratory work dealing with this development has been published.[2] The process is referred to as the Magnefite process, deriving its name from the first two and last syllable of magnesium bisulfite.

Because of the major implications which such a process might have, it was considered important that it be tested on a full mill scale. Our Cornwall, Ontario, mill where the tests were conducted normally operates on a calcium base system. It is not only integrated with a paper mill but also produces dried pulp for our other divisions and for the market. In converting from the laboratory to full mill scale, it was desirable to follow a stepwise programme. Since the pulp passes directly to the paper mill any unforeseen and undesirable results could thus be quickly detected and appropriate measures taken with regard to holding the dried pulp. Only one such occasion occurred in the whole program and this will be referred to later.

1. Development of Liquor Preparation

A single batch of cooking liquor could be produced in an existing tank fitted with a recirculating pump by continuously adding liquid SO_2 to the discharge side of the pump, and adding a slurry of magnesium hydroxide to the tank, adjusting the amount of water to give the final strength. With this equipment 12 cooks were carried out at intervals during a 3-month period without interruption to the regular calcium base system.

The results of these cooks were sufficiently encouraging that it was decided to set up an acid plant capable of producing mill cooking liquor at the regular mill rate so that it would be possible to carry out several cooks in sequence. For this system, sulfur dioxide, from the sulfur burner, was used because it was cheaper than liquid sulfur dioxide. Because of the inert gases carrying with the sulfur dioxide it was necessary to provide a different form of liquid gas contact than had been used in the earlier system. As part of a research study carried out jointly by Weyerhaeuser Timber Co., the Babcock and Wilcox Co., and ourselves, Rogers, Matty and Ralston[3] had found that such contact could be suitably obtained by spraying the liquid into the gas stream at the throat of a venturi. A single venturi of this type was set up at Cornwall for production of the liquor and approximately 1000 tons of Magnefite pulp were produced with this system. These cooks included the use of pine and poplar in addition to the normal spruce and balsam mixture.

More Modifications

On the basis of this work it was established that we would be safe in purchasing substantial quantities of pine chips available from a sawmill and of mixed softwoods available in

MAGNEFITE

the area consisting of about 55% hemlock, 25% pine and 20% tamarack. The pine was chiefly pitch pine which is native to this area. For this test, which was to run for 3 to 4 months, it was decided to make further modifications to the acid plant. This consisted of setting up an additional venturi over a second acid tank as shown in **Fig. 1.**

In this system magnesium hydroxide slurry was purchased in tank car lots at 50% solids and stored at the mill in a well agitated tank at a concentration of approximately 20% solids. The magnesium hydroxide was introduced at the suction of the tank recirculating pumps. The rate of addition was automatically controlled by pH measurement of the liquor, sampled at the discharge side of the pump, which actuated Beckman recording controllers located in the magnesium hydroxide lines.

Sulfur dioxide burner gas, after cooling, was blown by the gas fan to the strong acid tank through a polyester fiber-glass reinforced line to a stainless steel venturi where intimate contact of the gas and slurry was obtained. The exit gas from this tank was conveyed in similar fashion to a second venturi mounted over the weak acid tank and thence through a wooden grid packed scrubber to exhaust.

Hot water make-up was added to the weak acid making tank and the overflow from this tank was transferred to the strong acid tank by gravity flow. The acid in the strong acid tank which was controlled to the desired concentration and pH was pumped to an acid storage and thence to the accumulator.

All the digester relief including the blow down relief, but excluding the side relief, was directed to the weak acid tank ahead of the pH control point.

In addition to automatic pH control of the weak and strong acid systems, provision was made for recording the pH of the liquor leaving the weak and strong acid tanks.

It should be noted that the terms "combined" and "free" SO_2 are as defined by Tappi Standard 0-300. The combined SO_2 is conventially defined as that portion of the SO_2 that would be present as the monosulfite if $Mg(HSO_3)_2$ were completely dissociated as indicated:

$$Mg(HSO_3)_2 \rightleftarrows MgSO_3 + H_2SO_3$$

The free SO_2 is defined as the total SO_2 minus the combined SO_2. It can therefore be seen that:

When the combined SO_2 is equal to the free SO_2 then magnesium bisulfite only is present.

When the combined SO_2 is greater than the free SO_2 then the combined SO_2–the free SO_2 = the true monosulfite.

When the free SO_2 is greater than the combined SO_2 then the free SO_2–the combined SO_2 = the true sulfurous or the "excess" SO_2.

	Total SO_2 %	Combined SO_2 %	Free SO_2 %	Monosulfite SO_2 Combined-Free	Sulfurous Acid SO_2 Free-Combined	pH	Temperature
Strong Acid Tank	4.04	2.00	2.04	—	0.04	3.7	61°C
Weak Acid Tank	1.92	1.04	.88	.16	—	5.7	60°C

TABLE 1—TYPICAL ACID ANALYSES

2. Cooking Procedure—What Is Revealed

The techniques normally used in the Cornwall sulfite mill for impregnation of the chips were followed. The chips were run to the digester through the mechanical packer, and after the cone at the bottom of the digester was covered, steam was admitted at a predetermined rate sufficient to raise the temperature of the chips to 100°C. When the digester was full of chips and the steam reached the top, steaming was discontinued, the top was fastened and the liquor pumped in from the bottom. Liquor was allowed to recirculate from the top of the digester back to the accumulator to equalize concentration for a few minutes after filling. The top valve was then closed and the pressure was immediately increased to 55 psi by the aid of a booster pump. The bottom valve was then closed and the pump shut down.

In order to maintain a uniform digester sequence it was necessary to adopt the cooking cycle dictated by the digester with the smallest heat exchanger. Typical cooking conditions are shown in **Fig. 2.** As the heating proceeded the digester quickly reached a pressure of 96 psi where it was automatically controlled for a half hour. By this time it was considered that adequate impregnation had taken place, and by means of side relief a portion of the liquor was withdrawn from the digester and returned to the acid accumulator. Immediately the pressure dropped to a value just slightly greater than the vapor pressure of

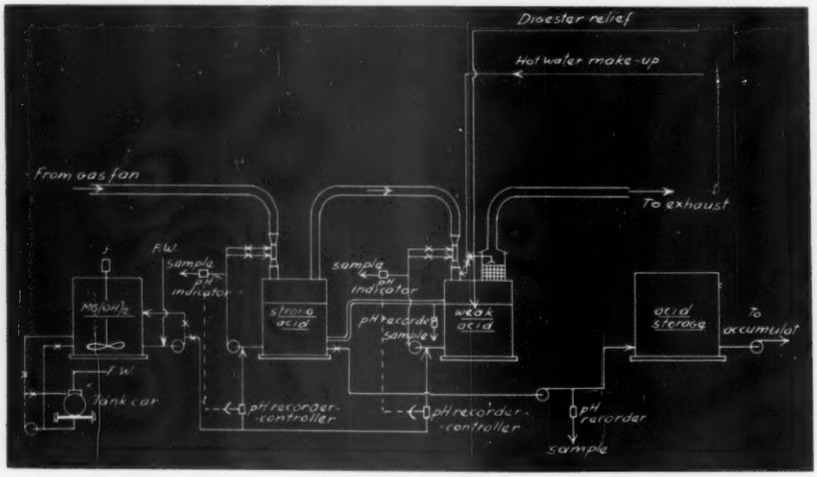


FIGURE 1—MAGNEFITE LIQUOR PREPARATION SYSTEM

water at the digester temperature, in this particular case to 26 psi.

As the temperature was increased the pressure was controlled at a slight overpressure of about 5 psi until the pressure rose to 95 psi, at which it was automatically controlled. After 1¾ hours at 166°C the pressure relief valve was opened and at 5½ hours from the start of the cook the digester was blown.

The pH of the liquor which was initially 3.8 dropped to 3.1 at 2½ hours from the start of the cook and then gradually increased to 3.7. The drop in pH is due to the formation of acids from the wood, the subsequent rise in pH is due to the release of a corresponding amount of sulfur dioxide. The total and combined sulfur dioxide drop throughout the cook, the values at the start of the relief being 0.83% and 0.25% respectively. A portion of the bisulfite is converted to thiosulfate and the cook should be terminated prior to the exhaustion of the combined SO_2. The chlorine number of this pulp was 7.8, the disperse viscosity (0.5% concentration in cupriethylene diamine) was 36.4.

A faster temperature rise would be possible with different equipment. A few individual cooks were satisfactorily run by supplementing the heat exchanger with direct steam giving a total heating time to 166°C of one hour and 40 minutes compared with the three hour heating time shown in **Fig. 2.** Laboratory results indicate that in a conventional digester the liquor can be heated as fast as the equipment will permit and that in a continuous digester the previously impregnated chips can be brought to temperature almost instantaneously by introducing them into a cooking zone already maintained at the cooking temperature.

The main cooking variables are pH, both initial and as maintained during the cook by pressure control, percent combined in the liquor and, of course, temperature. The higher the pH the longer time required; the higher the combined the shorter the time required at given temperature. Normally about 8% combined SO_2 on the wood is used for a chemical pulp and for a 4:1 liquor to wood ratio, a 2.0% combined initial liquor concentration is required. Laboratory work indicates that a lower liquor to wood ratio with higher percent combined concentration in the liquor would be desirable. However, due to the high level circulating collector ring on the mill digesters it was impossible to carry low liquor to wood ratios during this run.

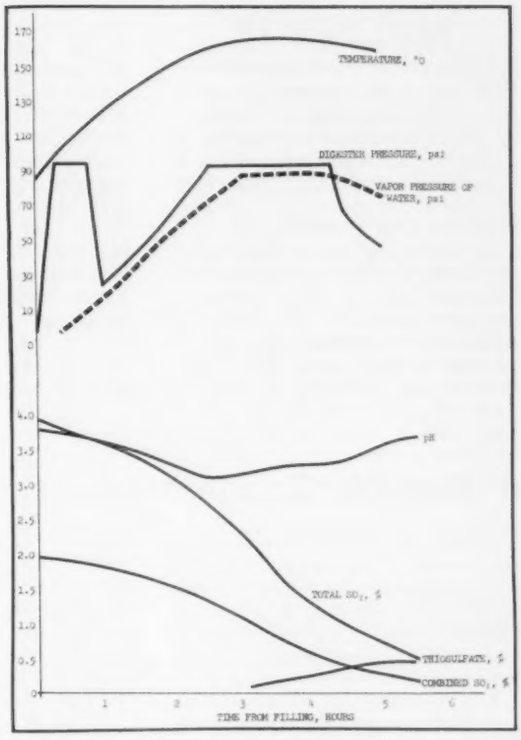


FIGURE 2—CORNWALL MILL—MAGNEFITE COOK

3. Reports on Pulp Yield and Pulp Strength

Unfortunately it is impossible to obtain an accurate measure of the percent-by-weight yield in the mill system. Accordingly tests were run in which weighed samples of spruce chips were placed in a screen basket in the mill digester, and the pulps produced were weighed and bleached in the laboratory. Regular and magnefite pulps using the same wood gave the results shown in **Table 2.**

This would indicate an increase in bleached yield of about 6.8% and would require an additional 40 lbs. chlorine per m.f. ton of pulp for bleaching to the same brightness.

Sample	*Average Unbleached Yield % m.f.*	*Chlorine number*	*Chlorine added in bleaching (86 Brightness) %*	*Shrinking during Bleaching % m.f*	*Bleached Yield from wood % m.f.*
Regular acid sulfite	47.5	3.4	6.0	3.95	45.6
Magnefite	51.2	5.4	8.0	4.95	48.7

TABLE 2—PULP YIELD—REGULAR AND MAGNEFITE PULPS USING SAME WOOD

Unbleached Pulp Strength

During the period of the run and immediately before and after the run the research department carried out approximately 150 beater tests to establish the range of strength values obtained and their relationship to standard pulps.

Averaged data from samples of unbleached and bleached pulps when beaten without prior drying are compared at 450 Freeness in **Table 3.**

At the unbleached stage it was found that the regular spruce and balsam mixture resulted in pulps with burst and tear values of 118% and 111% respectively of those for the regular acid sulfite. The "burst + ½ Tear" value was 116% of that for the regular pulp. With pine and mixed local softwoods the burst was very slightly less than regular pulp but the tear and bulk were higher by about 15% and 6% respectively when measured at 450 Freeness. The "burst + ½ tear" value was 104% of the regular pulp with normal wood.

With the hardwood pulps, only a limited amount of data is available, but the strength increase versus regular hardwood appears to be of the

same order as that observed with the spruce and balsam mixture. The "burst + ½ tear" value was 116% of that of acid sulfite hardwood pulp and 68.5% of acid sulfite spruce and balsam pulp.

Bleached Pulp Strength

The unbleached pulps were cooked to a somewhat higher bleach demand than the regular sulfite pulp, this being considered desirable from both the standpoint of increased yield and of avoiding cooking liquor breakdown. Unfortunately the existing bleach plant was somewhat under capacity for such a pulp with the result that when bleached to the 86-88 G.E. brightness level it underwent an appreciable loss in strength. However, during a short run at about 82-83 G.E. brightness it was established that excellent bleached strength could be obtained as shown in **Table II.** The burst + ½ tear value of the fully bleached magnefite pulp was found to be 111% and the medium bleached pulp 133% of that of the regular bleached sulfite. Laboratory bleachings indicate that similar strength values can be obtained with high brightness when milder bleaching conditions are used.

4. Possible Disadvantages and Problems

During the course of the mill trial it was possible to examine critically the various problems which might be associated with such processing and to consider means of satisfactorily dealing with them. The more important of these are listed below.

1. The higher cost of magnesium hydroxide compared with calcium carbonate and a greater consumption of the base, as compared with acid sulfite pulping adds materially to the cost and would indicate that in most localities a recovery system would be required when producing chemical pulp. However, the recovery system would result in high efficiency in both heat and chemical usage and would greatly minimize pollution.

2. In converting an existing calcium-base mill it is expected that the life of the digester linings designed for calcium base will be materially reduced. However, experience from the Longview, Wash. (U.S.A.) magnesia base mill of the Weyerhaeuser Timber Co. where soluble base linings have been used for approximately 10 years, suggest a somewhat longer life with such lining than has been experienced with the conventional type.

3. The limited solubility of magnesium monosulfite equivalent to about 0.6% SO_2 can result in its precipitation from the liquor during preparation in the acid plant unless conditions are engineered and controlled to avoid such concentrations. In the acid plant described this has not been a problem.

4. As shown in **Fig. 3** (reactions 1(a) and 1 (b)) magnesium bisulfite will react with sugars, formic acid, etc., to form thiosulfate. The thiosulfate in turn reacts with bisulfite to form sulfate and more thiosulfate, a chain reaction (reactions 2(a) and 2(b)). Thiosulfate, after exhaustion of bisulfite, can break down to yield elemental S (reaction 3).

These reactions, which were originally shown by L. G. Stockman (Swedish Cellulose Industry Research Laboratory)[8] to take place in the acid sulfite process can become a problem in the event of high concentrations of bisulfite or thiosulfate.

In one mill cook twice the normal chemical charge was used, namely, 4% combined SO_2 at the normal 4:1 liquor to wood ratio. The bisulfite concentration, high to begin with dropped very rapidly once the digester reached temperature and was completely exhausted before the digester pressure had been reduced for the blow, and in this case elemental sulfur formed in the liquor.

This was not the case when a vapor phase cook with the same liquor concentration and 2:1 liquor to wood ratio was used. In the latter case the bisulfite in the chips reacted rapidly with the lignin as the temperature increased thus decreasing its concentration by the time appreciable amounts of thiosulfate had formed as a result of reaction of bisulfite with the sugars.

However, in the case where the larger volume of liquor and 4% combined SO_2 was used, the high concentration of excess bisulfite in the liquor surrounding the chips was available for chain reaction with thiosulfate as soon as the latter had formed thus rapidly increasing its concentration and accelerating the rate of liquor breakdown. It has been shown in the laboratory that introduction of an appreciable amount of thiosulfate at the beginning of the cook through liquor recycle, etc., can have a similar undesired effect even when normal quanti-

	Number of Samples Tested	Time to 450 Freeness	Burst		Tear		Bulk		Tensile		Burst + ½ Tear	
			Tappi Factor	% of Regular	Tappi Factor	% of Regular	ccs/gram	% of Regular	Breaking length meters	% of Regular	Tappi Factors	% of Regular
WET UNBLEACHED												
Softwood Acid Sulfite:												
1. Before Test	10	23	58		66		1.23		9.2		91	
2. After Test	8	23	59		60		1.23		9.4		89	
Softwood Magnefite:												
3. Spruce and Balsam	16	30	69	118	70	111	1.24	101	10.9	117	104	116
4. Pine	7	35	58	99	72	114	1.31	107	8.8	95	94	104
5. Mixed Local Softwoods	10	30	57	98	73	116	1.29	105	9.2	99	94	104
Hardwood Acid Sulfite:												
6. Before Test	3	13	30		43		1.26		6.6		52	
7. After Test	2	13	35		39		1.29		—		55	
8. Hardwood Magnefite:	3	15	36	111	51	124	1.29	101	7.1	108	62	116
WET BLEACHED												
Spruce Regular:												
9. Before Test	10	27	50		56		1.20		8.7		78	
10. After Test	6	23	54		52		1.22		8.6		80	
11. Magnefite	13	31	57	109	61	113	1.24	102	10.0	116	88	111
12. Magnefite (medium bleached, 82.4 G.E.)	6	32	70	134	69	128	1.22	101	10.7	124	105	133

TABLE 3—SUMMARY OF VALLEY BEATER PULP EVALUATIONS—MAGNEFITE RUN, MARCH-JULY, 1958

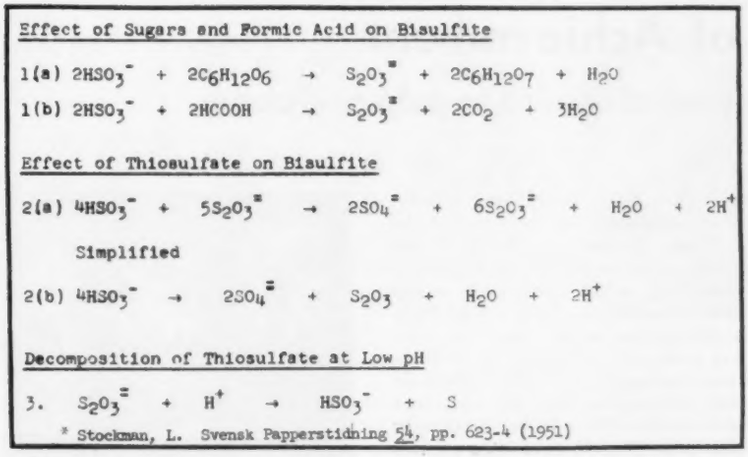


FIGURE 3—REACTIONS INVOLVING DECOMPOSITION OF BISULFITES*

ties of bisulfite are present.

However, with an understanding of these reactions such problems can be avoided.

5. Due to the absence of sulfur dioxide vapor the digester pressure drops when the side relief is withdrawn as shown in **Fig. 2.** This is desirable since it allows the release of the small amount of SO_2 resulting from reaction of the bisulfite with the acids formed as cooking proceeds. However, in the event that the air is not completely purged from the chips it will expand at the decreased pressure thus forcing liquor from the chips. In the same way if the digester pressure is obtained by air padding the release of the resultant dissolved air in the form of air bubbles on lowering the pressure will have a similar effect. With the method of steaming and the use of a hydraulic impregnating pressure which we use these do not constitute a problem, but could be if other methods of penetration are used.

Authors' Note

The processes referred to herein are the subject of issued and pending patents.

What Mill Trials Proved

Mill Trials at Cornwall, Canada established that a sulfite mill can be sustained in the future using woods locally available. Now a rational capital program can be developed involving the already proven magnesia base recovery process which will place the mill on highy efficient basis. Desirable qualities in the pulp and other advantages add further encouragement.

Although final decision has not been made as to timing of such a program it seems certain that the Cornwall, Canada, mill, which is the oldest sulfite mill on the North American continent and has been producing pulp continuously for over 70 years, will continue operation for many years to come.

Licensing arrangements can be made through the Babcock & Wilcox Co., New York City. The authors wish to acknowledge the assistance of the many individuals in the operating, technical and research departments who assisted in this experimental run.

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3. Private correspondence.

St. Regis Heads Look at Industry's Future

Roy K. Ferguson, chairman of the board, and William R. Adams, president, St. Regis Paper Co., in a joint report to stockholders, said world markets "present more interesting opportunities."

Other Ferguson-Adams comments:

"The U.S.A. paper industry again demonstrated its inherent strength, producing 30,700,000 tons of paper and paperboard during 1958 which equaled 1957 production and was only 2.3% below the historic high reached in 1956. The outlook for the industry's production in 1959 is favorable, with an expected gain of 4 or 5% over 1958.

"The long-term uptrend in the paper industry is basic. Since the turn of the century, U.S.A. production of paper and its products has risen sharply. In this era, annual U.S.A. per capita consumption of paper and paperboard rose from 50 lbs. to more than 400 lbs. Since consumption has increased much faster than United States population, steady growth in demand for paper and paperboard is expected to continue.

"As a result of its own expansion, St. Regis now has reserve capacity for paper and paperboard of about 150,000 tons per year, based on late 1958 rates of production.

"The bleached sulfate pulp mill at Hinton, Alberta, owned by North Western Pulp & Power Ltd. in which St. Regis has half interest, improved operations in 1958. Its production on occasions exceeded the rated capacity of 430 tons a day. This mill's rated productive capacity could be considered as 500 tons a day.

"With an expanding world economy, with rising standards of living in many countries and with the stabilizing of some currencies in relation to the dollar, the markets abroad for paper and packaging products present more interesting opportunities for American companies. During 1958, St. Regis broadened its international operations through more intensive development of export sales and through acquiring interests in additional manufacturing operations overseas. It completed negotiations to purchase half ownership in a group of companies that have three plants in the Union of South Africa producing corrugated, folding and set-up boxes.

"It also made arrangements for an initial investment in a kraft paper mill in Brazil to assure further the raw material supply of its two Brazilian multiwall bag plants."

Roy K. Ferguson .... William R. Adams

1929-1959: Era of Achievement

Pacific TAPPI marks 30th year of service to pulp and paper

Completion of 30 active years of service to the West Coast industry is being celebrated by TAPPI's Pacific Section. The group—founded June 22, 1929, as the first regional branch of the technical association—continues its successful efforts in improving industry techniques and processes, exchanging information and encouraging participation by young people in the pulp and paper industry.

Credited as the "first active step toward forming the section" was a conference on pulp and paper problems held on the Univ. of Washington campus in 1928. The following year saw the formal establishment of the group at Seattle.

World-wide recognition of the West Coast industry has been largely due to the active work of Pacific TAPPI through the years since C. R. P. Cash, then with the old Cascade Paper Co., called the first meeting to order as charter chairman.

In 1929 some important mills were inclined to "isolate company activities" rather than encourage a free exchange of information. The Pacific Section has been instrumental in breaking down this barrier. Such changes in company policy have been recognized in the section's 30-year history recently written by A. M. Cadigan:

"A modern, highly-instrumented pulp mill, operating under a most elaborate technical control, was put into operation (in the early 30s) by a progressive company whose policy was very much 'open door.' Visitors were welcomed. The personnel of the company became very active in the affairs of the section, presenting papers describing actual operational results and experiences. This enthusiasm, forthrightness and the resulting growing popularity of this firm in the technical field might have had much to do with allaying the fears and suspicions of those erstwhile reluctant companies that since 1934-35 have been staunch supporters and active members."

(Mr. Cadigan was named to the nominating committee at the section's first meeting. Although now retired as technical director of St. Regis, Tacoma, he retains an active participation in the group's activities.)

In 1935 the section expanded its activities to study the industry's problems and encourage interest on the part of young people. A committee was formed "to cooperate informally" with the Univ. of Washington in recommending and designing equipment for the pulp and paper laboratory in the new chemistry building then under construction on the campus. A research grant for studying gelatinization of wood and cellulose at the Univ. of Idaho was obtained that same year.

Twenty years ago the Pacific Section established what has become one of the industry's most successful programs—the Shibley Award Contest. It was named for Kenneth Shibley who suggested an award for the best paper presented at meetings during the year.

From this came a plan to hold an annual Shibley Award meeting at which young people in non-supervisory positions in the industry present technical papers involving original work. First-place prizes were $50 but subsequently increased to $100.

In 1946 the section and Pacific Coast Superintendents (APPMSA) held their first joint meeting.

Another Pacific Section achievement, inaugurated in 1946, has been its seminars on cellulose and lignin conducted annually by world authorities.

Magnusson .. Billington ..... Smythe

OFFICERS FOR PACIFIC TAPPI's 30th YEAR: Vice Chairman Norval Magnusson, asst. supt., Puget Sound Pulp & Timber Co.; Chairman Paul S. Billington, research associate, Weyerhaeuser Timber Co. Pulp div., and Sec.-Treas. Robert Smythe, Ray Smythe Co.

Pacific Section Chairmen Since 1929

FIRST CHAIRMAN OF PACIFIC TAPPI C. R. P. Cash, then with Cascade Paper Co., now key executive with Fibreboard Paper Products Corp.

C.R.P. Cash, Cascade Paper Co.; R. S. Wertheimer, Longview Fibre Co.; C. W. Morden, Morden Machines Co.; Ralph B. Hansen, Pulp Div., Weyerhaeuser Timber Co.; Lawrence Killam, British Columbia Pulp & Paper Co.; Myron W. Black, Inland Empire Paper Co.; Wm. R. Barber, Crown Willamette Paper Co.; Carl Fahlstrom, Longview Fibre Co.; George H. McGregor, Pulp Div., Weyerhaeuser Timber Co.; N. W. Coster, Soundview Pulp Co.; Fred A. Olmstead, Crown Zellerbach Corp.; Carl E. Braun, Hawley Pulp & Paper Co.; Edward P. Wood, Pulp Div., Weyerhaeuser Timber Co.; C. A. Enghouse, Crown Zellerbach Corp.; Erik Ekholm, Puget Sound Pulp & Timber Co.; H. W. Bialkowski, Pulp Div., Weyerhaeuser Timber Co.; G. H. Galloway, Crown Zellerbach Corp.; J. L. McCarthy, Univ. of Washington; Harold C. Wall, Longview Fibre Co.; Walter F. Holzer, Crown Zellerbach Corp.; Robert I. Thieme, Soundview Pulp Co.; E. O. Ericsson, Puget Sound Pulp & Timber Co.; S. E. Hazelquist, Pulp Div., Weyerhaeuser Timber Co.; F. J. Weleber, Publishers' Paper Co.; E. H. Nunn, Crown Zellerbach Corp.; John M. McEwen, Pulp Div., Weyerhaeuser Timber Co.; Ben T. Briggs, Rayonier Inc.; Norman S. Lea, Scott Paper.

Jacoby ..... Beauchamp ..... Reynolds ..... Johnson

EFFICIENT CONTROL IS VITAL to the modern mill. Speakers at the Pacific Coast TAPPI meeting discussed the issue: B. J. JACOBY and A. J. BEAUCHAMP, both of Crown Zellerbach at Camas; and VANCE REYNOLDS and MRS. LUELLA JOHNSON of Puget Sound Pulp & Timber Co.

Westfall ..... Elder ..... Fellicetta ..... Baxter

POLLUTION, BRIGHTNESS AND PRINTABILITY were topics of the day at Aberdeen: FRED A. WESTFALL, Scott Paper Co.; JOHN ELDER, Weyerhaeuser Timber Co.; V. F. FELLICETTA, chemical engineering, U. of Washington, and J. H. BAXTER, Crown Zellerbach Corp.

Production, Testing and Handling

. . . come under scrutiny at Aberdeen, Wash., meeting, where experts compare notes on papermaking's latest techniques

By LOUIS H. BLACKERBY
Western Editor, PULP & PAPER

● Short cuts are effectively utilized in making control tests at Crown Zellerbach Corp.'s big Camas, Wash. mill. As a result of expanding pulp production in both tonnage and grades, the demand for pulp control tests has mounted. Examination of the testing methods disclosed time-saving possibilities that could be employed while maintaining accuracy and reliability standards.

In one of several papers presented at a recent meeting of the Pacific Coast Section TAPPI, Bernard J. Jacoby reported that the use of the Waring Blendor as a laboratory pulp refiner "helped us considerably" in finding short cuts that could be employed effectively. Mr. Jacoby, a CZ Camas pulp quality chemist, pointed out that comparative tests disclosed that the Blendor could provide the same information on the strength of soft pulps as had previously been obtained by using a conventional refiner. In addition, the Blendor results "appeared to be at least as reproducible" as those obtained from the refiner; comparable results pertaining to pulp bursting strength can be obtained from refiner and Blendor.

Tests comparing Blendor-processing results with those achieved by a laboratory beater show similarity in mullen and tear properties for unbleached sulfite pulp.

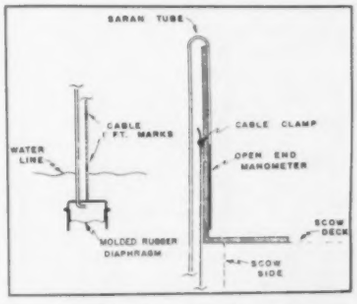
According to Mr. Jacoby, the regular two-speed quart-size Blendor with stainless cup has characteristics making it "very desirable" for testing soft pulps. These include: (1) dependability—with good reproducibility and simplicity of operation, (2) economy (saving at least 50% of testing time over former method), low initial cost, low mainteance.

Tests made in Crown Z mills indicate specific limitations for the Blendor. It is not adaptable for tests on strong softwood kraft pulps. Its small capacity limits the test quantity to enough pulp for a freeness test and two or three handsheets. In the case of making incremental tests similar to the standard beater test, it is necessary to weigh out several samples and make individual tests on each. "This, however, is still approximately half as time consuming as running a standard beater test," Mr. Jacoby reports.

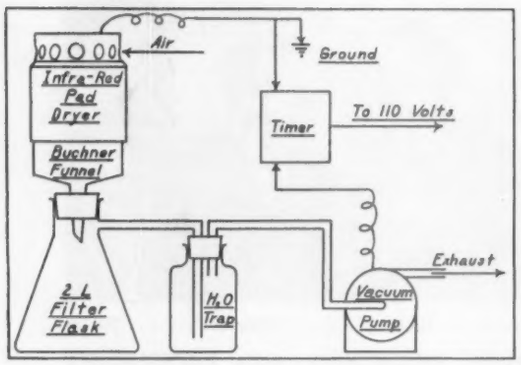
Automatic Pulp Titrations

The automatic titration of pulp permanganate numbers is another accomplishment achieved through efforts to streamline the CZ Camas testing program, according to A. J. Beauchamp, pulp technician. For developing such a unit and delivering a paper on it, he won the 1957 Shibley Award of $100 (p. 50 June '57 P&P) and a year later received the $250 award from Crown Z (p. 83 June '58 P&P).

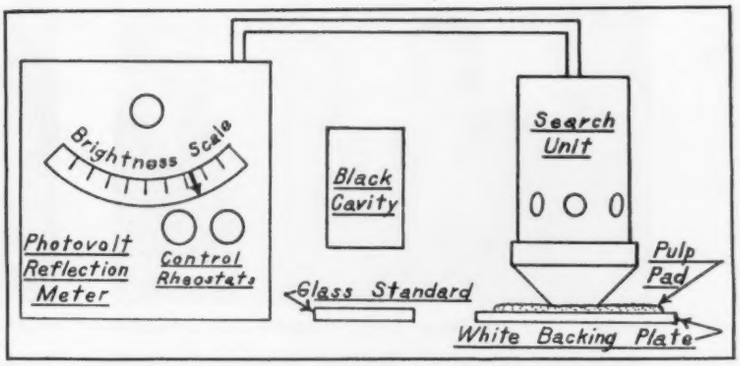
Two such automatic testing components are in operation at the Camas mill, and a new improved version will be built soon. With the addition of this third unit, which incorporates modifications providing flexibility for handling most any type pulp, "all of



IN WEIGHING CHIPS BY DISPLACEMENT Puget Sound Pulp & Timber uses this equipment arrangement for accurately measuring scow's freeboard.



UNIQUE SET UP FOR MAKING AND DRYING PULP TEST PADS in 4 min. at the Weyerhaeuser Timber kraft mill.



ARRANGEMENT FOR RAPID BRIGHTNESS READINGS of pulp pads in checking the bleaching stages at Weyerhaeuser Timber, Everett.

our pulp titrations will be run on automatic equipment," forecasts Mr. Beauchamp.

Weighing Waterborne Chiploads

The problem of weighing chips transported from supplier sawmills to consuming pulp mills by barge has been solved, declared Vance Reynolds, chemical engineer, Puget Sound Pulp & Timber Co. In seeking an easily-executed accurate means of determining weight of scowloads, a method was developed that involves measuring the volume of water displaced by the loaded barge.

This method, utilizing the fact that the change in water displacement of a scow during unloading equals the weight of load (chips) removed, is relatively precise and requires little equipment and manpower. "After initial measurements have been made on a scow," Mr. Reynolds states, "subsequent loads can be measured by one man in 15 min." After weighing, unloading procedures can be carried on without interference.

Ashing Chemically

Wet ashing with perchloric acid in preparing pulp, spent sulfite liquor and miscellaneous mill samples for elemental analysis "can be very beneficial," according to Luella Johnson, chemist at Puget Sound Pulp. "It is rapid, especially with a large number of samples; no ignition loss; no necessity of drying liquid samples; and the procedure invariably furnishes a homogeneous solution. This is important with samples containing metals such as iron because the fusion step, usually necessary in the dry ashing method, is eliminated."

Mrs. Johnson specifies that this technique is not recommended for large samples high in organic matter and cannot be used when actual ash values are required. Adequate hooded venting is essential to quickly exhaust perchloric fumes from the laboratory. Nitric acid should be used in conjunction with the perchloric acid to destroy the easily oxidizable material and to effect slow concentration and temperature increase to obtain controlled oxidation of the resident organic residue.

Automatic Liquid Sampling

Scott Paper Co., in meeting the dual objective of efficient production and the exclusion of materials from waste that might detract from the Puget Sound receiving waters, takes effluent samples every 15 min. This sampler operates automatically. According to Fred A. Westfall, instrument supervisor at the Everett, Wash. plant, the unit is installed through a manhole and extends into the main effluent line far enough for the intake to always be submerged.

The sampler consists of two pipes, one inside the other. The outer one functions as a casing and has an accumulation chamber at the bottom end. The inner pipe, the one through which the liquid samples are extracted, has a free-floating lid (for covering open end of chamber) at its bottom end. The top of the inner attaches to a hose leading to a collection tank and also connects with an air-operated cylinder.

A sampling cycle, described by Mr. Westfall: A timer energizes the four-way solenoid admitting compressed air into the cylinder, thus opening the collection chamber. Following a time interval for the chamber to fill with effluent, the solenoid is de-energized, and the lid closes. The timer then energizes a three-way solenoid injecting pressurized air into the space between the inner and outer pipes. This forces the sample up the inner pipe into a receiving vessel.

The sampler, made of 316 stainless, can be set for any desired frequency.

Brightness Tests on Slush Stock

In using "brightness" as a bleach plant control factor at the Weyerhaeuser Timber Co. kraft mill at Everett, Wash., tests requiring less time were desirable. The plan involved measuring brightness on slush stock at several stages in the bleaching process. Chemical feed would be adjusted to maintain predetermined brightness. The TAPPI method, involving 2-4 hours for sheet drying, required too much time.

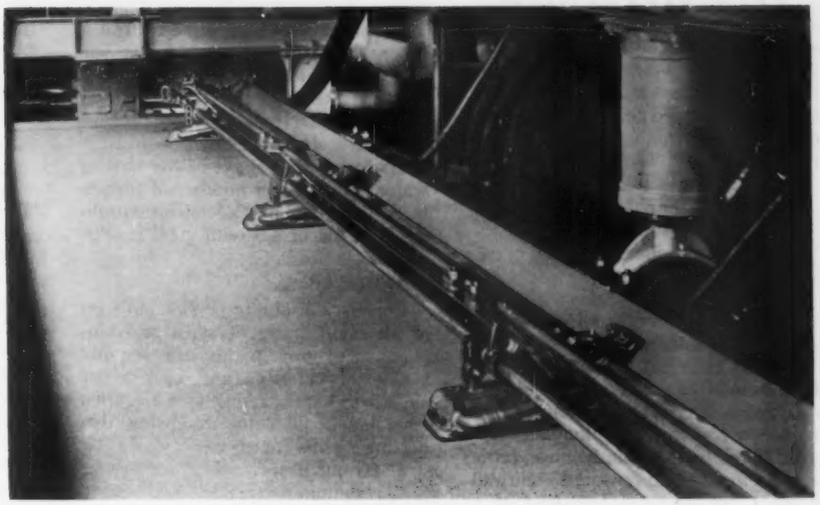
Members of the WTCo. Pulp div. staff developed equipment and techniques for making these control tests rapidly, according to John M. Elder, project chemical engineer. Pads are now dried, ready for brightness reading, in just 4 min.

The timer-controlled dryer uses a 250-watt infrared lamp for drying. It mounts at the top of a 10-in. high × 6-in. diam. insulated cylinder into which the pulp sample is poured. The pad forms in a Buchner funnel to which the cylinder attaches. Two 20-mesh diffusion screens in the bottom of the cylinder protect the pad from brightness loss.

Rating Printability

A test has been developed at Crown Zellerbach's West Linn Div. for numerically rating printing quality. Such a test was needed, according to J. H. Baxter, mill technical dept., to facilitate selecting pulps for use in printing grade furnishes.

The test includes (1) standardized preparation of samples, (2) press printing under controlled conditions, (3) reading the resultant printed and unprinted areas with an opacimeter and (4) converting the resultant printability factors to a numerical scale based on a rating of 100 for groundwood.



KEEPING FELTS "OPEN AND CLEAN" is a big problem in the mill. Here a Vickery felt conditioner tackles the job on the 224-in. first press felt of a modern paper machine. The conditioner is equipped with jordan type vacuum boxes and high-speed gear boxes.

Effects of Felt Washing

. . . on machine operation and production. Here is data on contaminants and their control, washing agents and techniques.

By L. H. BROWN

(Editors Note: Establishment of a full-scale project for investigation of the best methods of felt cleaning while a machine is producing paper was recently announced by Albany Felt Co., Albany, N. Y. The studies are intended to develop data that can be used by mills to get maximum production with fewer shutdowns, thereby reducing costs and increasing machine output. Lawrence H. Brown of the Albany Felt service engineering staff has been appointed director of this project and is responsible for the actual field tests, several of which are already under way. In this article Mr. Brown summarizes an exhaustive survey made of felt washing techniques. It is presented here in the belief that it will help identify the problem, its causes and some of the more common washing agents and techniques currently in use.)

● Everything used in papermaking is a potential contaminant for a felt. However, those most commonly responsible for felts filling up can be divided into five main categories: bacteria, pitch and other tarry residues, fillers, sizing agents and synthetic resins.

Some mills experience no significant difficulty with any of these materials and are able to run their felts to the end point without shutting down for washing. In others, one or more make washing essential to efficient papermaking.

Bacteria Increase Plugging

Bacteria are blamed by several authors for the filling-up problems encountered in many mills. Probably the most extensive published work is that done by French[12] and Drescher and Christensen[10] at the University of Minnesota. They determined that any time bacteria are introduced into a felt plugging increases up to four times.

Penicillium and Aspergillus seem to be the commonest bacteria found in felts and probably the most likely to cause plugging. Sphaerotilus natans, due to its gelatinous sheath, can cause serious plugging. The latter collects ferric hydroxide on its sheath. Since ferric hydroxide carries a positive charge, it will attract negatively-charged clay and rosin size in the furnish.

The bacteria types mentioned should be distinguished from those that cause degradation by attacking the wool. The former merely attach themselves to the fibers of a felt and then cause plugging by attracting other materials in the furnish to themselves.

Shema[22] claims the best method for controlling bacterial degradation is to run stock and shower water at a pH of 5.0 - 5.5. Proteolytic bacteria (the type that feed on wool) flourish in a pH range of 5.5 - 9.0—the optimum range for growth being 6.5 - 8.0. To counteract this, shower water can be run at a lower pH and also be chlorinated to not over 0.1 part per million.

According to McGrath[17], treating shower water to eliminate bacteria has increased felt life up to 15%.

There are a number of bactericides that can be used. For example, a 10%

FELT WASHING

formalin solution or a 0.005% solution of phenylmercuric acetate can be very effective in controlling bacteria. Others include:

1. **Chlorine**
2. **Mercuric chloride**
3. **Copper sulfate**
4. **Sodium silico-fluoride**
5. **Phenol**
6. **Resorcinol**
7. **Pentachlorophenol**
8. **Parachlorophenol**

Special chemical treatments of the felts themselves are also used, not only to combat bacterial degradation, but to prevent premature plugging. Applied to felt by the manufacturer, these have demonstrated repeated ability to prevent premature degradation of a felt due to bacteria attack. Since felts fill up much faster when degraded, such chemical treatments are obviously an important tool for any mill trying to extend felt life by preventing plugging.

Pitch a Major Cause

Pitch, asphalt, gums and other tars are frequently responsible for filling up. Pitch resins themselves are considered by several authors[11, 14, 16, 18] to be a mixture of fats and rosins in about equal proportions. The ether soluble portion contains the fats and is generally conceded to be the underlying cause of pitch problems.

Because so many mills have experienced difficulty with pitch, a number of observations have been made about its behavior on paper machines. For example:

1. Hard, prolonged beating aggravates pitch.
2. A closed white water system accumulates pitch.
3. High temperatures cause pitch to become tacky.
4. Dry alum fillers and insoluble soaps resulting from water hardness cause agglomeration of pitch.
5. Slime agglomerates pitch (possibly this explains why pitch problems increase in summer).
6. Oils in foam killers agglomerate pitch.
7. Pitch formation occurs at any pH, but is worst at pH 7.0.
8. Resin acids react strongly with copper, forming sticky compounds with it; copper in a system containing pitch is to be avoided.

A number of solutions or aids have been suggested for this problem. One school advocates materials and techniques to disperse pitch or asphalt.

A second theory of pitch control is the addition of compounds that will harden the pitch and prevent it from becoming tacky.

As with bacteria, one of the most effective methods of pitch control appears to be pH control of the shower water. There are a number of reports in Albany Felt files of mills controlling to a pH of 4.5 with good results.

Clay and Fillers

Clay is a kaolinite crystal built up of alternate layers of silica and alumina. The tiny plates are roughly hexagonal in shape and bear a net negative charge, acting as a negative ion. Asdell[3] lists the following dispersing agents for clay:

1. **Strong Bases**
   sodium hydroxide
   barium hydroxide
2. **Salts of a Strong Base and Weak Acid**
   sodium metasilicate
   sodium silicate ("S" Brand)
3. **Complex Polyphosphates**
   sodium hexametaphosphate
   sodium tetraphosphate
   tetra sodium pyrophosphate
4. **Organic Reagents**
   sodium lignosulfonate

Where deposits were mainly filler, French[12] discovered that the ash test was an excellent method to measure plugging. He failed, however, to link the amount of clay and size with increased or decreased plugging.

Rosin Size: a Disagreement

Size can be a definite factor in the filling of felts. Zellers[25] points out that one mill solved a "pitch" problem by making up its rosin size emulsion with soft water. The hard water formerly used was forming insoluble rosin soap.

French[12] speculates that while rosin size may not be the actual cause of plugging, it may be the binding material that sticks the plugging material to the felt.

At the University of Minnesota, Drescher and Christensen[10] discovered that rosin caused more plugging than any other single material.

While these two views do not agree, it seems reasonable that rosin size cannot be discounted as a filling agent.

Rosin size is normally eliminated through precipitation by aluminum sulfate[9]. ($Al_2(SO_4)_3 \cdot 18\ H_2O$). It has been proven that the alum requirement is higher for a low-free rosin size. If a sizing is desired with a higher pH value, an alkaline precipitating agent, sodium aluminate, is used.

Evidence has also been found that wet strength resins, primarily urea or melamine formaldehyde, contribute to plugging of felts. These resins occur in three stages:

"A" Stage—where they are similar to monomers with little or no cross linkage.

In this stage, the resins contribute little or no wet strength, are water soluble and readily removed by conventional cleaning processes.

"B" Stage—This is the intermediate stage in the cure of reaction cycle of these resins, which are soluble in water or other solvents.

Beater additives are of this type.

"C" Stage—Melamine and urea resins are thermosetting in that they will become hard, insoluble and infusible upon the application of heat. They must be brought to this stage by reaction to obtain maximum wet strength characteristics. This final reaction is usually accomplished as the stock passes through the dryers. However, these resins will slowly advance from the "B" to the "C" stage when exposed to room-temperature air. Thus, if not removed by proper washing, any of these resins remaining in a felt will gradually cure and eventually plug it.

Melamine resins are sensitive to acid. Felt washes for wet strength, therefore, recommend the use of acetic acid. A typical felt wash is given[2] as 2 qt. glacial acetic acid plus a nonionic detergent dissolved in 50 gal. water.

Washing Agents: No Sure Cure-All

One of the chief difficulties in obtaining satisfactory felt cleaning is non-uniformity of soiling. Consequently, there is no single material that is a sure cure for all conditions. For general cleaning, several writers[18, 7, 24, 21] agree that a fast-wetting penetrating, low-alkaline material is best. Effective penetration or wetting is important, since intimate contact with soiling materials must be established before dispersion and suspension can occur. For on-the-fly cleaning, Blanchard[7] claims a neutral cleaner should be used. This will not affect the stock, cause discoloration or affect sheet color.

Soaps: Pro and Con

Some authors feel that soap should not be used for felt washing, claiming that high-titer soaps are especially unsuitable. They will gel at low temperatures at high concentrations, are hard to wash out in cold water, and fatty acids contained in them are absorbed by the wool fiber. Blanchard[7], however, claims that old style, low-titer soaps still work best on certain color pigments.

All soap leaves traces in the felt that

will react with alum and hard water. Mitchell[18] points out that textiles are soaked in a dilute soap solution and then in alum to form a water-repellent metallic soap. He contends, therefore, that soap washing will tend to make a felt water repellent.

Rossiter and Morehouse[21] and Mitchell[18] agree sulfonated soaps, used with a mild alkali, are very satisfactory for washing, especially during the early life of a felt. They have good emulsifying powers but poor detergency.

Normal soap pH is 10.2. The Laundry Research Assn., however, has found that its best detergent action is obtained by "building" with an alkali such as soda ash to a pH of 10.4-10.6. This is safe for wool washing providing the temperature is not over 120°F.

It also has been proven that some acidity is present in dirt, and—unless a "builder" is added—some soap is destroyed or used up neutralizing this acidity. With hard water, as much as half the soap is used up for calcium precipitates, which then must be washed away.

"Builders" are alkalis and are used strictly for pH control since they have practically no surface tension lowering power.

The best builders for deflocculating action are trisodium phosphate and silicate. Mitchell[18], however, claims that trisodium phosphate is too alkaline to be considered for felt washing.

When soaps are used for felt washing, they are more effective in low concentrations. Several baths should be used with a rinse in between. Further, the proteins that form wool have pronounced colloidal properties, which lead to physical union with metallic oxides, acids, dyestuffs and pigments. Consequently, partially fouled liquors wash wool better than clean ones because of the protective colloidal action of the emulsion formed.

Detergents: Effective with Alkali

Detergents are either sulfonated higher alcohols or sulfonated acids. Sluhan[23] lists the following compounds as detergents.

1. **Sulfated higher alcohols**
2. **Sulfonated amides**
3. **Sulfated fatty acid esters**
4. **Sulfonated ethers**
5. **High-molecular weight alkyl aryl sulfonates**

These may be grouped in three categories: anionic, cationic and non-ionic. Anion types carry a negative charge and, upon electrolysis, will migrate to the anode. Cationic detergents carry a positive charge, will migrate to cathode or negative pole. Cationic types detergents include:

1. Primary and secondary amine acid salts
2. Quaternary ammonium compounds
3. Sulfonium compounds
4. Phosphonium compounds

Factors affecting the efficiency of a detergent include:

1. pH or initial alkalinity of detergent solution
2. Total alkalinity of buffer value of solution
3. Effect of lowering interfacial tension between soil and water
4. Deflocculating and emulsifying power

In general, detergency is affected by type of surface to be cleaned, type of soil to be removed, temperature and pH of the cleaning solution. Most soils carry a negative charge. If possible, then, the surface to be cleaned should be made to assume the same charge, so they will repel each other.

Cellulose carries a negative charge in water, which is more pronounced in the presence of alkali. Detergents, therefore, are most effective in the presence of alkali.

Further, wool and silk are amphoteric in nature and carry a charge depending on the pH of the treating medium. Above a pH of 4.5 wool carries a negative charge. Washing a woolen felt, therefore, with an anion type detergent must be done in an alkaline medium. But wool can be scoured on the acid side with a cationic surface active agent. The new non-ionic detergents provide a solution to washing under acid or alkaline conditions. They have proven quite effective.

Wetting Agents

Wetting agents are used to break down the natural water repellency of wool and thereby facilitate washing. These agents are of two types:

Polar

Ionized
High-dielectric constant
High melting point
Water soluble
Insoluble in organic solvents
High boiling point
Melt conducts electricity

Non-Polar

Non-ionized
Low-dielectric constant
Low melting point
Water insoluble
Soluble in organic solvents
Low boiling point
Melt doesn't conduct electricity

The polar portion of the wetting agent molecule is directed into the water, while the non-polar portion is attracted to any normally water-repelling surface. Although they may have some dispersing power, wetting agents are not necessarily dispersing agents. The latter promote the separation or deflocculation of particles by overcoming adhesive forces between individual particles.

Ohf[19] performed experiments on felt water absorptivity. He found that sulfonated fatty alcohols with trisodium phosphate were the best wetting agents; sulfonated oils and organic solvents, the least efficient.

Rossiter and Morehouse[21] and Mitchell[18] also determined that pine oil is useful in felt washing where penetration is a problem, especially with grease and pitch.

Belani[8] reviews a number of new felt washing materials. Potassium soaps with suitable solvents (such as alcohols, acetones, certain esters, benzine, xylol, toluol, carbon tetrachloride) appear to be very effective on felts and jackets. Dichlorethane is a good cleaner but toxic and inflammable. Ethylene perchloride is also good but may give an acid reaction.

Washing Formulas

Rossiter and Morehouse[12] developed a number of washing formulas. They have incorporated a "bath factor" in their calculations. The "bath factor" is the proportion of water to be used based on the weight of the felt. If gallons are used in the calculation, the "bath factor" should be divided by 8.33.

Formula 1A (to be followed by Formula 1B)
2% mixed organic acids, (acetic, formic, lactic)
30 bath factor
140°F temperature
30-min. washing time

Formula 1B (Neutralizing Bath)
2% soda ash (58%)
30 bath factor cold
15-min. washing time

Formula 1 is effective on metallic soaps such as aluminum resinate.

Formula 2
6% low-titer soap
1½% soda ash (58%)
½% tetra sodium pyrophoshate
20 bath factor
120°F temperature
30-min. washing time

Formula 2 is a good average washing solution.

Formula 3
5% synthetic detergent
2% acetic acid 28%
20 bath factor
140°F temperature

FELT WASHING

30-min. washing time

Formula 3 is good for acting on alum precipitates.

Formula 4
5% low-titer soap
3% synthetic detergent
1% soda ash
20 bath factor
120°F temperature
30-min. washing time

Formula 4 is a good general washing formula.

Formula 5
20% emulsified solvent (3 parts kerosene, 1 part naphtha, 1 part emulsifying base)
20 bath factor cold
1 hr. washing time

Formula 5 is very good for heavy pitch formation. It should be followed with a regular scouring.

Felt should be washed in a stretched-out position to avoid uneven strain when passing between pressure rolls. It is possible to cause localized felting of the fabric otherwise. Pressure on the rolls should be light.

To figure the cost of washing a felt, the following formula can be used:

$$\frac{M + (T \times F)}{D \times P} = C$$

where:

M equals the cost of washing materials; T the machine down time; F the cost per hours of machine time; D the days run after washing; P the production per day, and C the cost per ton of the scouring operation.

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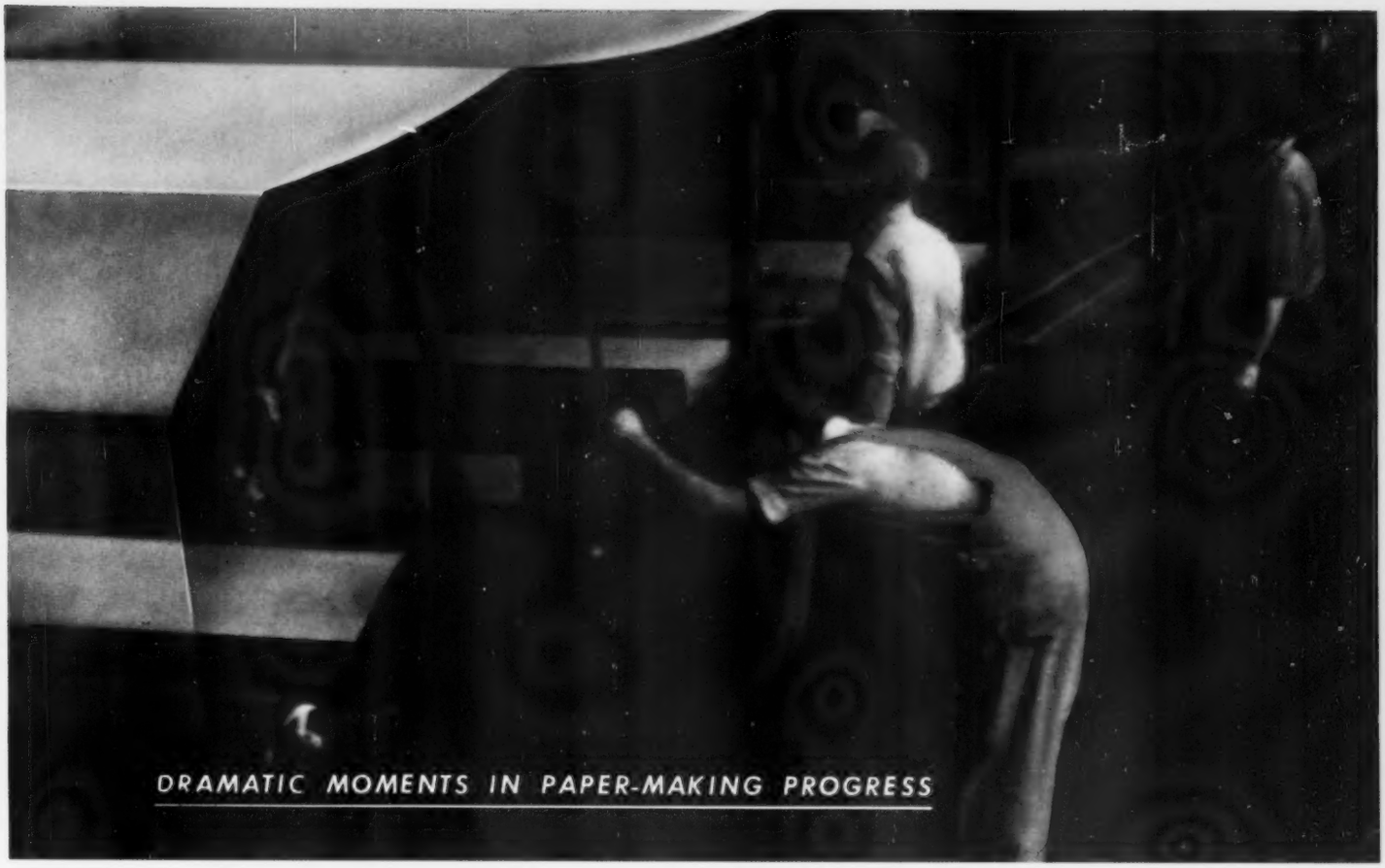
Representative Pulp and Paper Companies Sales and Earnings—1958

	Net Income (000)	Income Bef. Taxes (000)	% of Sales	Net Income (000)	Net Per Share
MARKET PULP (also Lumber, etc.)					
Brown Co. (11/30)	$ 55,408	$ 1,391	2.5%	$ 1,296	$0.50
Puget Sound Pulp & Timber	25,189	6,811	27.0	3,081	1.25
Rayonier Inc.	108,018	7,422	6.9	3,602	0.65
MacMillan & Bloedel (9/30)	162,355	15,173	9.3	8,109	1.53
Weyerhaeuser Timber	410,360	79,615	19.4	49,615	1.64
NORTHERN INTEGRATED COS.					
Abitibi Power & Paper	123,386	20,127	16.8	9,657	2.19
Consol. Water Power & Paper	76,408	12,632	16.5	5,967	2.35
Diamond Gardner	168,808	13,170	7.8	7,370	1.92
P. H. Glatfelter	23,127	4,367	18.9	2,034	5.53
Great Northern Paper	52,742	1,339	2.5	628	0.29
Hammermill Paper	46,500	n.a.	—	2,328	2.06
KVP (9/30)	52,779	5,495	10.4	2,765	3.06
Oxford Paper	62,783	5,611	8.9	2,656	2.13
D. S. Warren	61,189	7,128	11.6	3,440	3.15
INTEGRATED—NORTH AND SOUTH:					
Champion Paper & Fibre (12 mos. ended 12/31/58)	166,659	16,657	10.0	8,094	1.74
Container Corp.	259,271	29,325	11.6	14,514	1.35
Crown Zellerbach	468,813	60,041	12.8	33,234	2.32
International Paper	915,143	139,505	15.2	72,000	5.46
Kimberly-Clark 4/30) (12 mos. ended 1/31/59)	342,587	46,603	13.6	23,737	2.79
Riegel Paper	62,110	n.a.	—	3,001	2.29
St. Regis	376,789	40,540	10.8	21,059	2.42
Scott Paper	285,004	44,409	15.6	22,114	2.75
Union Bag-Camp Paper	156,908	32,929	21.0	15,654	2.13
West Va. Pulp & Paper (10/31)	208,109	18,425	8.9	9,575	1.78
NON-INTEGRATED PAPER COS.					
American Writing Paper	14,698	1,373	9.3	675	2.50
Sutherland Paper	61,992	4,621	7.5	2,236	1.97
CONVERTER					
Dennison Mfg.	40,545	3,623	8.9	1,839	2.80

n.a.—not available

The sales and earnings for the year of 1958 were especially prepared for PULP & PAPER by Cyrus J. Lawrence & Sons, members New York Stock Exchange, from statistical services and published reports. While the figures are believed to be correct, no guaranty is given as to their accuracy.



What can match the thrill of the first run on a new paper-making machine? *Only 90 minutes after the first start-up, press-ready paper was produced at Southland Paper Mills, Lufkin, Texas* on a new Pusey and Jones Fourdrinier machine.

This new machine was a huge, 270-inch wire-width Fourdrinier, the third complete paper-making machine designed, built and installed by Pusey and Jones for Southland. It typifies Pusey and Jones' ability to provide on-time start-ups for paper mills the world around.

Top photograph: *Wire of new Southland machine being moved into operating position as it rests on the power-operated undercarriage of Pusey and Jones' Rapi-Drape Wire Changing Device.*

Bottom photograph: *Overall view of new Southland Paper Mills machine.*

Data on Southland's New Fourdrinier Machine:

Wire Width, length and speed: 270" wide x 118' long. Speed 2500 f.p.m.

Number of presses: Two 42" diameter main suction press rolls, complete with vacuum pickup.

Dryers: 53 main paper dryers; one sweat dryer; 8 felt dryers, 60" diameter x 268" face.

Calendar stacks: One, 8-roll with 40" diameter bottom roll, 26" diameter next-to-bottom roll, and six 18" diameter intermediate and top rolls.

Reel: Latest horizontal, uniform-speed type.

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WILMINGTON 99, DELAWARE

West End "fills the order" for free-flowing salt cake

Storage for 25,000 tons of industrial chemicals


Immediate shipment in leased hopper cars


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Meeting service requirements to the letter and producing superior salt cake of consistent chemical analysis are the essentials to which the West End organization is uniquely geared. A system of rapid communications linking our sales office in Oakland with our production, technical and shipping departments at the desert plant site permits each department head to have a complete understanding of the customer's individual requirements and to make firm commitments or provide the desired information promptly.

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Beautiful specimen of Nature's handiwork: Sulphur Crystal embedded in the matrix of limestone and calcite crystals recovered from a drill core taken hundreds of feet underground while exploring a Sulphur deposit. (Ektachrome by Keturah Blakely)

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Solid Sulphur by Rail, Barge, or Ship

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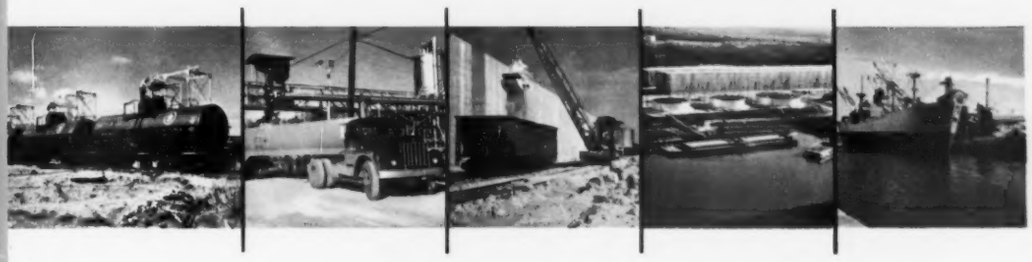
Technical Service on problems involving the Use and Handling of Sulphur

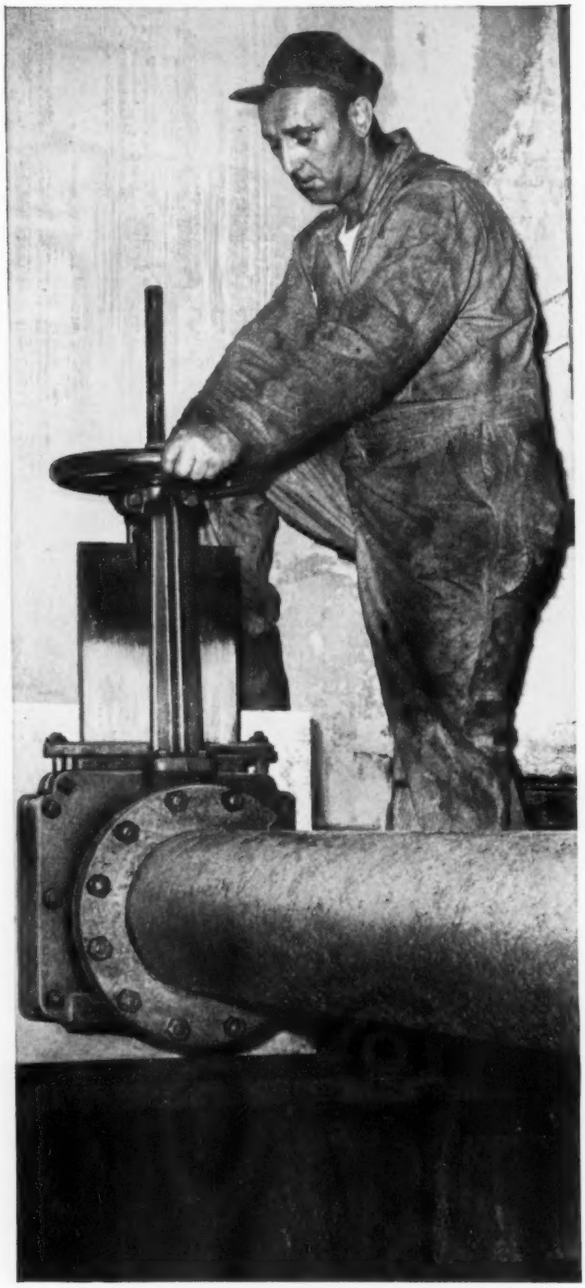
SULPHUR



from left to right:
Loading Tank Cars with Molten Sulphur
Loading Tank Trucks with Molten Sulphur
Loading Gondolas with Solid Sulphur
Loading Barges with Molten Sulphur
Loading Freighters with Solid Sulphur

TEXAS GULF SULPHUR CO.
75 East 45th Street, New York 17, N. Y.
811 Rusk Avenue, Houston 2, Texas
Sulphur Producing Units: Newgulf, Texas • Spindletop, Texas • Moss Bluff, Texas • Fannett, Texas • Worland, Wyoming

Crane pulp stock valve still maintenance-free after 10 years' service



Ten years ago Badger Paper Mills, Inc., Peshtigo, Wis., installed a 10-inch Crane pulp stock valve in a line conveying mildly corrosive pulp from the blow pit to the bleach plant.

This line was important to the paper-making process; therefore, it was necessary that the valve operate with 100% dependability. Valve trouble meant a costly stoppage of the entire pulp-cooking process until repairs could be made.

The Crane pulp stock valve, No. 1425, installed over ten years ago, has never required one minute of down time for maintenance. And it opens as easily and closes as effectively today as it did the day it was installed.

Saves valve users' money

Construction features of Crane pulp stock valves virtually end maintenance costs. They include bonnetless design . . . full port area flow . . . deep-notched design of outlet port that divides pulp flow into small bunches for easy shearing by knife edge of descending disc . . . lead filler seat that protects disc knife edge . . . easily accessible cleanout area. For full details—including sizes, trim, etc.—see your Crane Representative.

Write for Circular AD-2156 today. This 8-page booklet is your complete guide to ordering Crane pulp stock valves for all services.

CRANE® **VALVES & FITTINGS**

PIPE • PLUMBING • HEATING • AIR CONDITIONING

Since 1855—Crane Co., General Offices: Chicago 5, Ill.—Branches and Wholesalers Serving All Areas

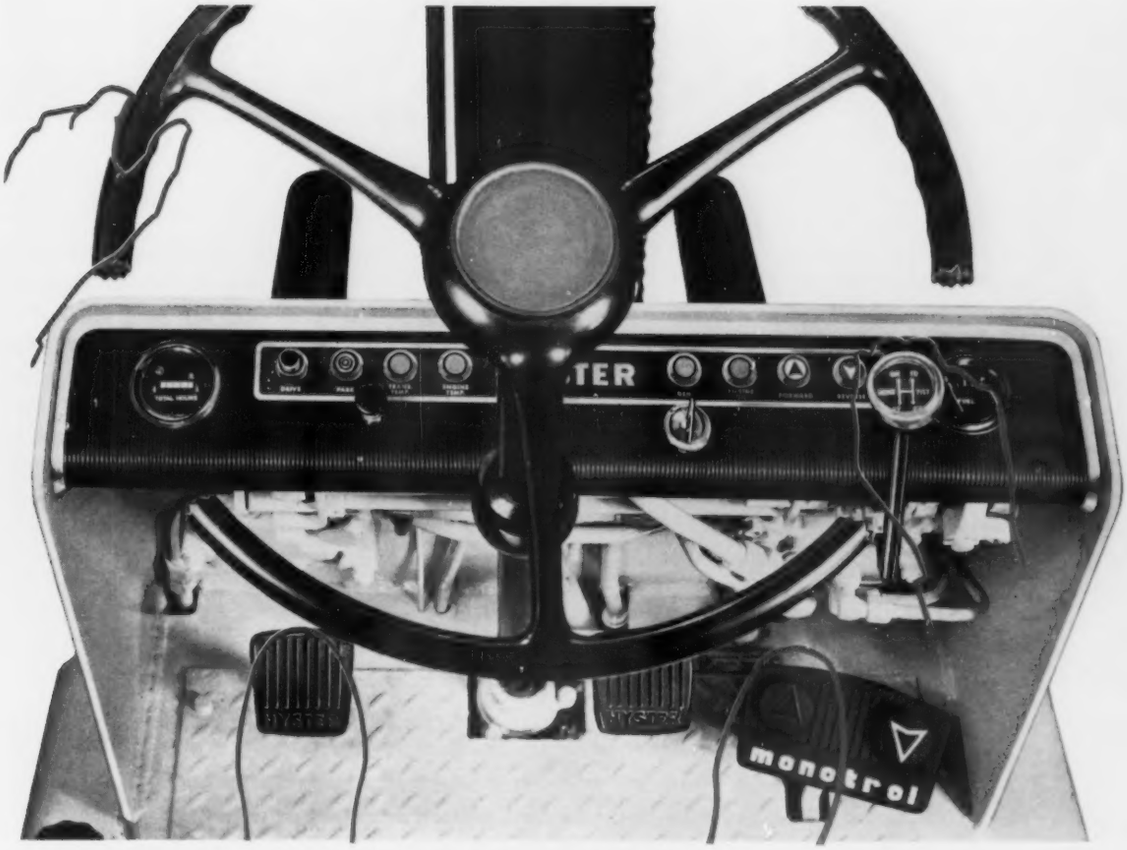
One man...

your Allis-Chalmers man... can supply and coordinate all this equipment — and more

Pumps, motors, drives, processing machinery, electrical equipment, water conditioning equipment, materials handling equipment — Allis-Chalmers builds them all. Much of it is specifically designed for pulp and paper service. All of it is designed to work together. And you get more, much more, than the finest equipment when you specify Allis-Chalmers. The obvious time- and money-saving advantages of single-source buying, and a host of services ranging from preliminary planning to continuous field service, are all yours.

Whether you are contemplating major modernization or the profitable addition of a single machine, the man to call is your A-C representative. His recommendations are backed by the many Allis-Chalmers engineering departments, by complete research and testing facilities, by experience gained in a close working relationship with the pulp and paper industry. *For complete information, contact your nearby A-C sales office or write Allis-Chalmers, Milwaukee 1, Wisconsin.*

ALLIS-CHALMERS A-5975-PP



NEW *from* HYSTER

monotrol

Sets a new standard for lift truck safety and performance

Monotrol is Hyster's exclusive new lift truck control system "human engineered" to eliminate unnecessary and unnatural driver motions. Result—more work done per day with greater safety.

- **Forward-reverse and speed are *right* foot controlled by single Monotrol pedal. No hand shift lever.**
- **Left hand is free for full time steering; right hand for load control.**
- **Push buttons control automatic parking brake.**
- **Left foot controls inching-brake.**

Ask your Hyster Dealer to demonstrate the all new Hyster SPACESAVER 30-40-50 Lift Trucks with Monotrol control system. Write for Bulletin 1679, HYSTER COMPANY, P. O. Box 847, Danville, Ill.

HYSTER®
INDUSTRIAL TRUCK DIVISION

MOVING AHEAD WITH INDUSTRY

Factories: Danville, Ill. • Portland, Ore. • Peoria, Ill. • Kewanee, Ill. • Glasgow Scotland • Nijmegen, The Netherlands • Sao Paulo, Brazil • Sydney, Australia (licensee)

GASPESIA IS YOUR QUALITY PULP

Did you know that Gaspesia makes pulp for letterhead and envelope stock as well as glassine windows?

For envelopes and letterheads, *Gaspesia Standard* is your quality pulp. For quality windows or any other glassine use, it's *Gaspesia Glassine*. Make Gaspesia the sole source for your sulphite requirements.

Location on the Gaspé Coast, within easy reach of waterways to the whole world, affords low-cost water transportation to every market. Shipping time tc Europe is about half that from the Pacific Coast. Transcontinental rail systems speedily deliver carload quantities to United States and Canadian markets.

Have you tried Gaspesia?

GASPESIA SULPHITE COMPANY LTD.
CHANDLER, QUEBEC, CANADA

SOLD BY: **Anglo Paper Products, Ltd.**
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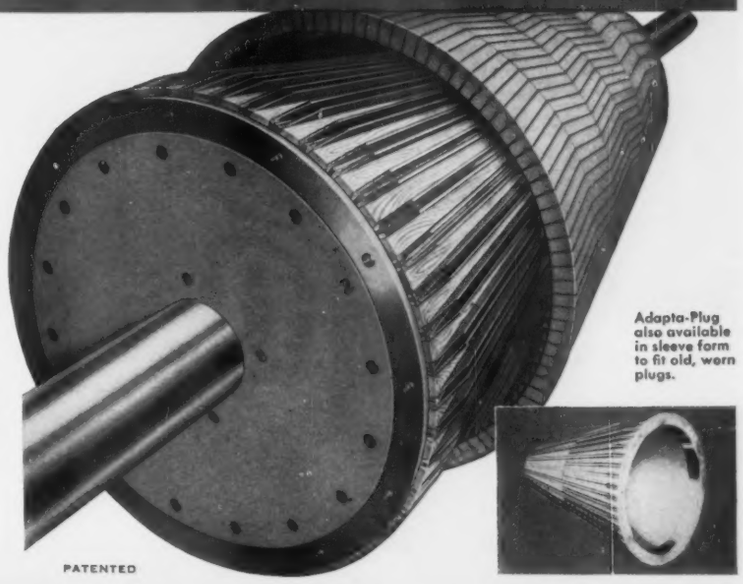
SALES REPRESENTATIVES IN THE UNITED STATES:

Northeastern Paper Sales, Inc.
400 Madison Avenue, New York 17, N. Y.
20 North Wacker Drive, Chicago 6, Ill.

PROVEN Jones Adapta-Plug

Many mills report spectacular savings for stripping and filling this completely bandless plug. Inverted-wedge-type slots hold bars more securely, eliminate slot wear and corrosion. Exclusive Nowave design assures precise alignment, closer contact, straighter bar wear, longer filling life, accurate plug settings, and better, more uniform refining. For full details on Jones Adapta-Plug send for Bulletin EDJ-1094 and 1094A.



PATENTED

Adapta-Plug also available in sleeve form to fit old, worn plugs.

AND FULBAR SHELL FILLINGS

Fulbar one-piece construction cuts installation time, often by hours.

Unlike sectional fillings, rigid Fulbar readily compensates for inequalities in old shell body.

Jones Fulbar fillings are available in *any* bar combination for *any* make of Jordan. Their rigidity and accuracy eliminate the need for keys and wedges. They are far easier to install, easier to grind in —and the patented Nowave pattern offers no sharp bar ends to form strings or lumps. For full details, send for Bulletin EDJ-1094.

SAVE TIME, SAVE MONEY, GIVE BETTER RESULTS

E. D. JONES CORPORATION

Pittsfield, Massachusetts

Member of the Beloit Group

ESTABLISHED 1845 PAPER MAKING Jones MACHINERY

Jones equipment is sold in Canada by *The Alexander Fleck, Ltd.*, Ottawa • Overseas Export Agents: *Castle & Overton, Inc.*, New York 20, N. Y. • Foreign Licensees: France — *Batignolles-Chatillon* • Italy — *de Bartolomeis* • Spain — *Gabilondo* • Japan — *Mitsubishi Heavy Industries.*

WHY PAY FREIGHT ON WATER?

The Bauer-Bale System of Preparing Pulp For Shipment Eliminates this "Extra" Cost

Halifax Power & Pulp Ltd., Sheet Harbour, N.S., had been shipping groundwood pulp at about 56% air dry solids. After installing the Bauer-Bale system, moisture content of shipments was greatly reduced so that easy-to-handle bales are now 96% air dry solids. In addition, several other advantages including better customer acceptance and wider market range are being realized. Here are results reported by this mill:

• Shipping costs greatly reduced. Previously when shipping a 500 lb. bale of wet lap pulp, moisture accounted for half the weight • Storage space savings. A ton of 56% a.d. groundwood baled pulp takes up about 110 cu. ft.; the same pulp when Bauer Bale processed takes up only 60 cu. ft. • Pulp can be shipped to more distant markets and can be stored in warm climates without deterioration • Reduced handling costs benefit both supplier and customers.

For more information on this modern method of preparing pulp for shipment, ask for Bulletin P-20-A.

The Bauer Bros. Co. • 1706 Sheridan Ave., Springfield, Ohio

Bailey Recorder is key to "step-by-step" automation

When you are pioneering a new process and don't know all the answers, complete automation is seldom practical. The first step is to identify your variables and measure them. Nothing does this job better than a Bailey Recorder. One instrument can record any four variables that can be converted to electric *or* pneumatic signals.

Once you get a better understanding of the variables in your process, you will want to add controls and feed back your measurements. Here's where the versatility of the Bailey Recorder comes into play. For the same Bailey instrument you use to record variables is designed to accommodate plug-in control units.

When you use a Bailey Recorder, you can build your instrumentation along with your process. At the start, you use only the plug-in units for recording. Then you add plug-in controls as you see the need for them.

For the complete story of how you can use a Bailey Recorder for step-by-step automation, see your Bailey Engineer. G-42-1

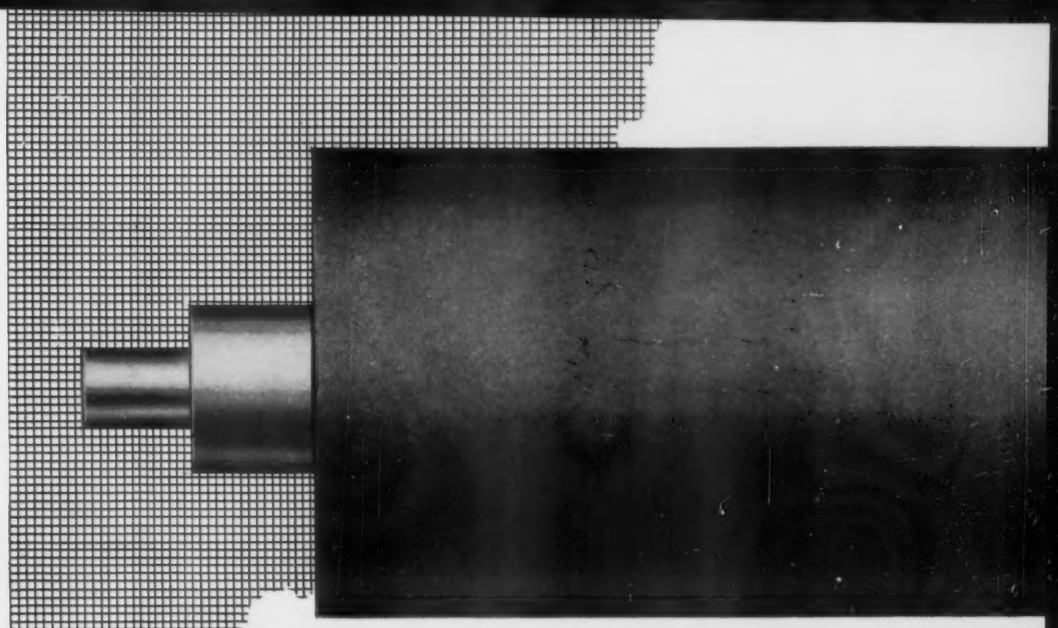
Instruments and controls for power and process

BAILEY METER COMPANY

1037 IVANHOE ROAD • CLEVELAND 10, OHIO

In Canada—Bailey Meter Company Limited, Montreal

BAILEY METERS



EXCLUSIVE

NEW "Tred-Roc" BY GRIFFITH

STONE-HARD ROLL COVERING FOR THE WIRE POSITION

The best roll ever developed for the wire position in high speed paper machines.

Its extremely hard, glossy surface virtually eliminates wire drag. Unequaled abrasion resistance assures amazingly long life and reduces costly "down" time for re-grinding or re-covering.

"Tred-Roc" is exclusive with Griffith Rubber Mills and costs no more than a standard covering.

QUALITY SERVICE 47 YEARS

Griffith®

RUBBER MILLS

General Office

2439 N. W. 22nd AVENUE

PORTLAND 10, OREGON

Telephone: CApitol 3-7126

straightline speed reducer

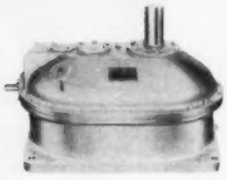
all-motor horizontal gearmotor

all-motor right angle gearmotor

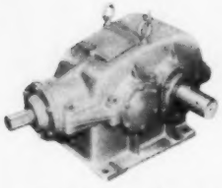
integral vertical gearmotor

integral horizontal gearmotor

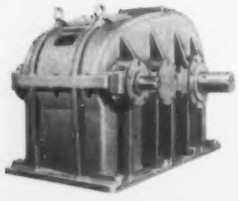
keep down-time down...



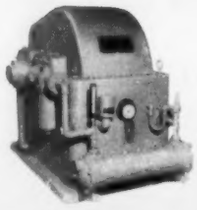
large right angle vertical speed reducer



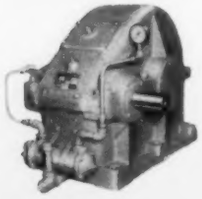
large right angle horizontal speed reducer



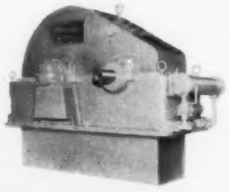
parallel shaft speed reducer



small high speed unit



medium speed unit



large high speed unit

with **WESTERN GEAR** *SPEEDMASTER*

FULL LINE POWER TRANSMISSION EQUIPMENT

vertical speed reducer

Years of experience with user problems have been translated into superior designs that provide practical benefits. Greater reliability, increased production, lowest maintenance cost, no-cost engineering assistance ... all benefits save you time and money.

Western Gear offers a complete line of gear drives in various shaft arrangements and ratios up to 10,000 HP for most industrial applications. Many special designs beyond our catalog range.

WESTERN GEAR CORPORATION Industrial Products Division P.O. Box 126, Belmont, Calif.

name & title _____

company _____

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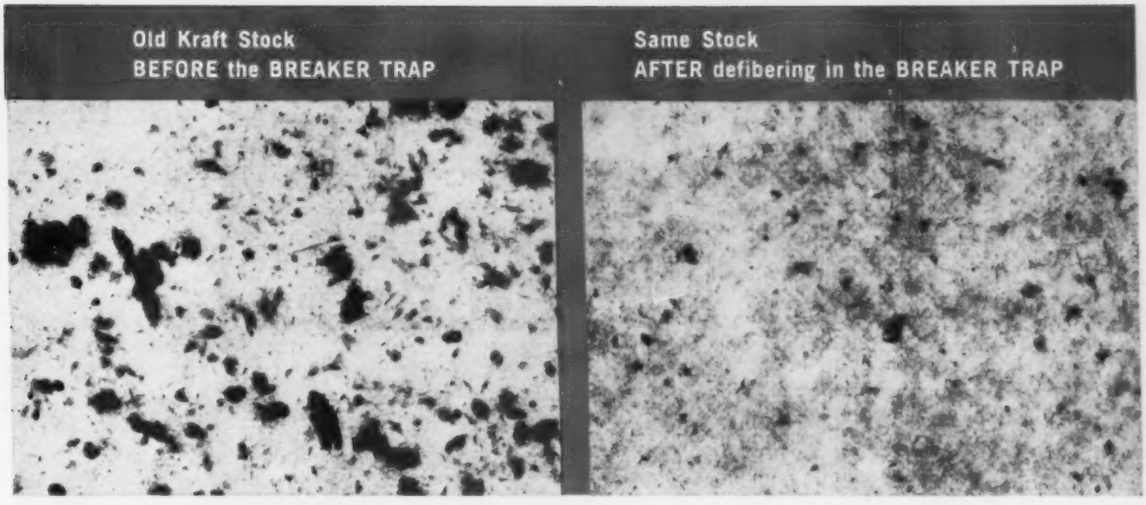
Please send me:

- ☐ *Gearmotors Bulletin 5806*
- ☐ *Parallel Shaft Speed Reducers Bulletin 5802*
- ☐ *StraitLine Speed Reducers Bulletin 5816*
- ☐ *Vertical Speed Reducers Bulletin 5908*
- ☐ *High Speed Unit Bulletin 5904*

5907



Black-Clawson BREAKER TRAP...

Uses 55% Less Defibering Horsepower

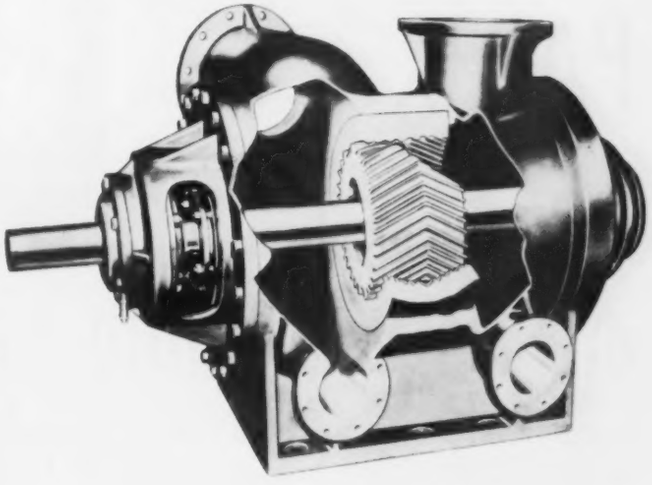
These hand sheets show the degree of selective defibering you can get with a Black-Clawson Breaker Trap installed after your pulper—and you can get it for *less than 2 hp per ton per day.*

Compared with the power needed to obtain the same degree of defibering in a conventional disc refiner, conical refiner or jordan, the Breaker Trap will do the job—*and save as much as 55% defibering horsepower.*

The Breaker Trap efficiently separates fibre bundles and disperses the stock. There is no bar-to-bar contact—usable fibres are salvaged and waste materials are left intact. Maximum screening efficiency for cleaner, higher yield is the result.

It is especially effective for defibering dirty waste papers, old kraft, .009", virgin pulps, de-ink stock, broke stock and has many applications in the pulp mill.

The power savings is substantial, the defibering is excellent, the cost is low. Available in 12" or 18" dia. rotor for either batch or continuous operation. Have your Shartle Division sales engineer show you other hand sheets and application data pertaining to the stock you're using. Or, write to Shartle for complete details on the Breaker Trap.



Long wearing stainless steel rotor and stator of Breaker Trap operates at fixed gap.

SHARTLE DIVISION
STOCK PREPARATION EQUIPMENT

THE BLACK-CLAWSON COMPANY

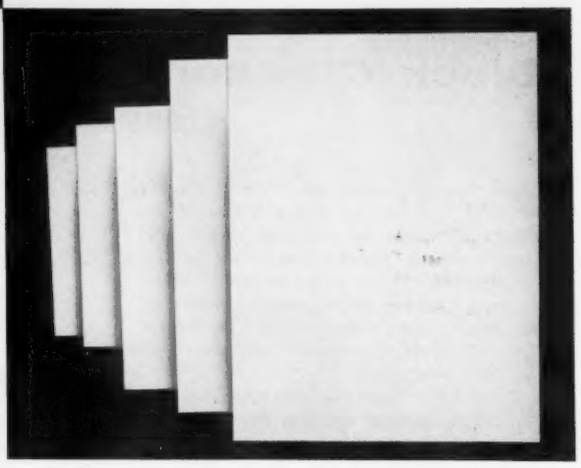
SHARTLE DIVISION, MIDDLETOWN, OHIO

Executive Offices—250 Park Ave., New York, N. Y. • Pandia Division, Pulp Mill Equipment, Hamilton, Ohio • Paper Machine Division, Paper and Board Machines, Watertown, N. Y. Dilts Division, Converting Machinery, Fulton, N. Y. • Black-Clawson (Canada) Ltd., Canadian Sales & Manufacture, Montreal, P.Q. • Black-Clawson International Ltd., British-European Sales and Manufacture, London, England • District Sales Offices, Atlanta, Ga.; Downingtown, Pa.; Portland, Ore.; Appleton, Wis.; Hamilton, Ohio

In Canada: Black-Clawson (Canada) Ltd., 5460 Patricia Ave., Montreal 24

CLEANER FIBERS....

CLEANER PAPER....



WHEN YOU DE-INK WITH...

d-i LESTOIL LIQUID DETERGENT

Yes, d-i LESTOIL assures you of cleaner, more flexible fibers, a cleaner, better quality sheet with more uniform color from all grades of raw stock . . .

. . . because d-i LESTOIL thoroughly wets out the stock, dissolves, emulsifies and disperses ink, grease, wax, asphalt and adhesives . . . makes them miscible with water.

LESTOIL destroys the adhesive qualities of contaminants and prevents their redeposition in fibers, on wires and felts, or elsewhere in the system. d-i LESTOIL keeps your whole system clean and free-flowing . . . the result, a cleaner sheet!

FREE, a generous sample of d-i LESTOIL and full details — yours for the asking. Write today

P.S. d-i LESTOIL is ideal for washing felts, too—on or off the machine.

LESTOIL, INC. HOLYOKE, MASS.
a subsidiary of Adell Chemical Co.

COST OF CLEARING?
only $8.53 an acre with this D6!

South of North Bend, Oregon, the Menasha Wooden Ware Corp. initiated a reforestation program on 1,000 acres of logged over land. The area was hilly and heavy with dead logs, stumps, brush and small alder. For clearing sections like this, the company used a Cat D6 Tractor with No. 6S Bulldozer and a winch pulling a disc harrow. The disced strips, 7 feet wide and 10 feet apart, were laid out on contour. Production: 1.2 acres an hour at the cost of only $8.53 an acre. Said Ralph W. Horn, Land and Timber Manager: "For size, power, cost and maneuverability, the D6 is tailored for this job."

From clearing through planting, that sums up the low-cost answer to *any* phase of reforestation—the right tools for the job on hand. Here the D6 proved itself the right power tool. Built to outwork any tractor of comparable size, the D6 combines high production and availability with low-cost operation and maintenance. For instance, its Caterpillar Engine operates without fouling on economy-type diesel fuels. Its exclusive oil clutch delivers up to 1,500 hours without clutch adjustment.

Is the D6 the best answer to your site preparation work? That depends entirely on the job. You may find that a D4, D7, D8 or D9—or a Traxcavator—serves your purpose best. For dollars-and-cents figures about their performance on all phases of reforestation, see your Caterpillar Dealer!

Caterpillar Tractor Co., Peoria, Illinois, U.S.A.

Forest site preparation —machine-and-method cost studies available

Growing a profitable crop at the lowest possible cost calls for methods and machines best suited to each phase of the operation. Complete cost studies, compiled from actual jobs, are available on the following subjects: Stump Treatment; Stump Clearing and Tree Cutting; Chaining; Raking and Windrowing; Harrowing; Planting. For information, write Logging Section, Caterpillar Tractor Co., or call your nearby Caterpillar Dealer.

CATERPILLAR

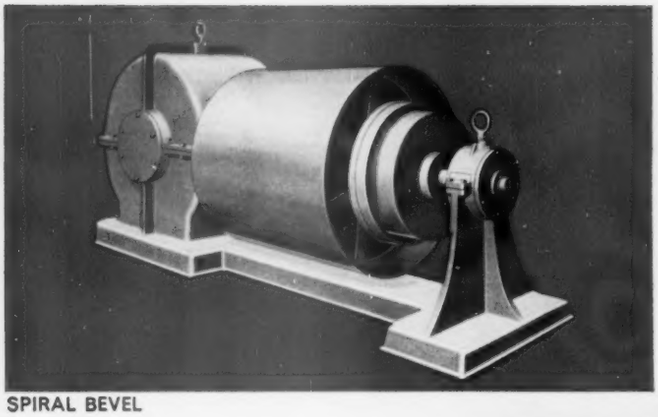
Caterpillar, Cat and Traxcavator are Registered Trademarks of Caterpillar Tractor Co.

HEAVY-DUTY WOODS EQUIPMENT FOR THE HARD WORK

BELOIT UNIT MODERNIZATION

Rugged Beloit Drive Units

MODERNIZATION
WITH PROVED BELOIT UNITS
...CUTS COSTS
...INCREASES SPEED
...IMPROVES QUALITY



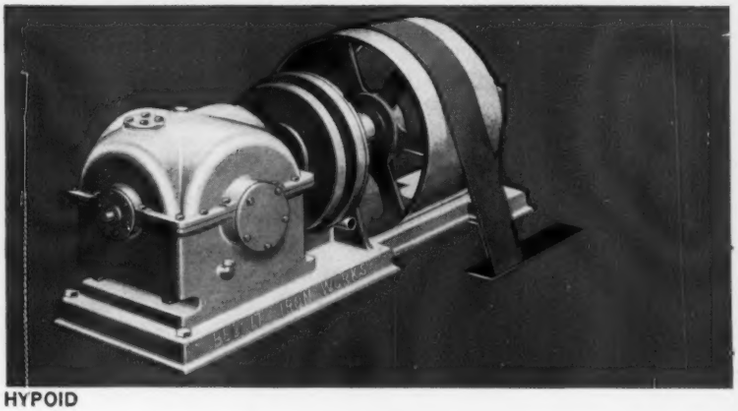
SPIRAL BEVEL

Modest horsepower requirements?

If horsepower requirements are modest, consider the Beloit spiral bevel drive arrangement. This drive is particularly suited to the moderate-speed machine requiring relatively low horsepower. This simple, economical drive embodies top-quality components and is designed for efficient operation over a wide range of weights and draw conditions. A rugged, low-priced unit with a fine performance record.

High horsepower requirements?

Beloit's rugged hypoid drive units are designed to carry high horsepower. This drive has given outstanding performance on wide machines running in the upper speed ranges. New design features have added to the inherent advantages found in this particular drive arrangement. Hypoid units can be driven from basement or overhead lineshaft setups.



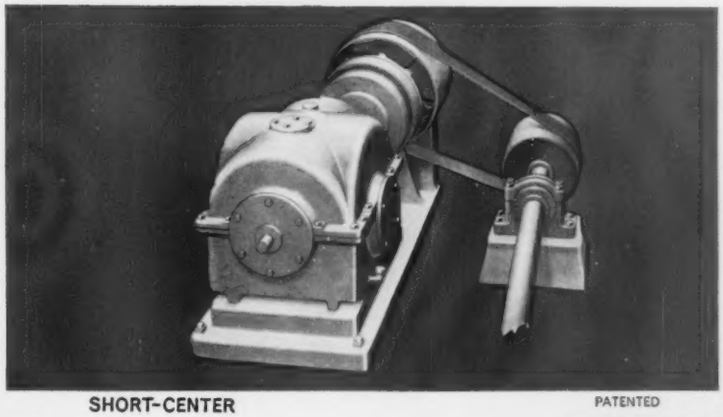
HYPOID

PROVED BELOIT UNITS: HELPER TYPE DRIVES · RUGGED BELOIT AIR CLUTCHES · SLACK TAKE-UP ARRANGEMENTS · INCHING DRIVES

ONE OF A SERIES SHOWING TYPICAL BELOIT SOLUTIONS TO COMMON MILL PROBLEMS

Improve PRODUCTIVITY

A paper machine is no better than its drive. So a paper machine modernization program will almost always include some drive changes. Greater machine efficiency and productivity often can be obtained with only minor drive changes. Other situations may call for a completely new drive. Whatever the circumstances, Beloit drive units offer the rugged dependability that mills require in a paper machine drive. Beloit drive systems supply the required horsepower for given speed levels . . . provide accurate speed settings . . . maintain stability under varying load conditions . . . and hold precise draws. Drives shown below merit your careful consideration.



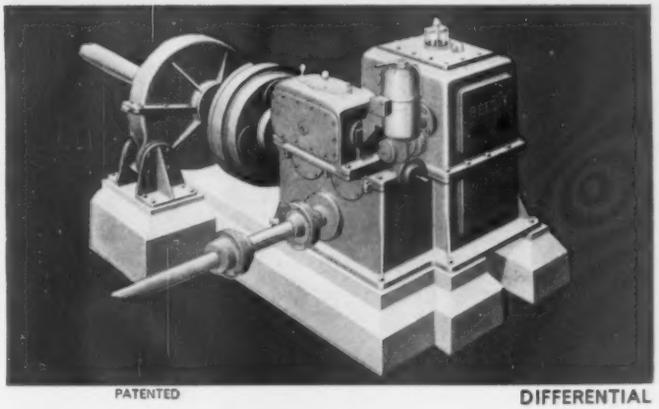
SHORT-CENTER PATENTED

Need a floor-level drive?

If a floor-level type drive is in order, consider Beloit's short-center units. This drive arrangement keeps machine-room basement clear for auxiliary machine equipment or storage. Short-center arrangements are particularly adapted to machines with modest horsepower requirements where basement space limitations exist.

High-speed draw problems?

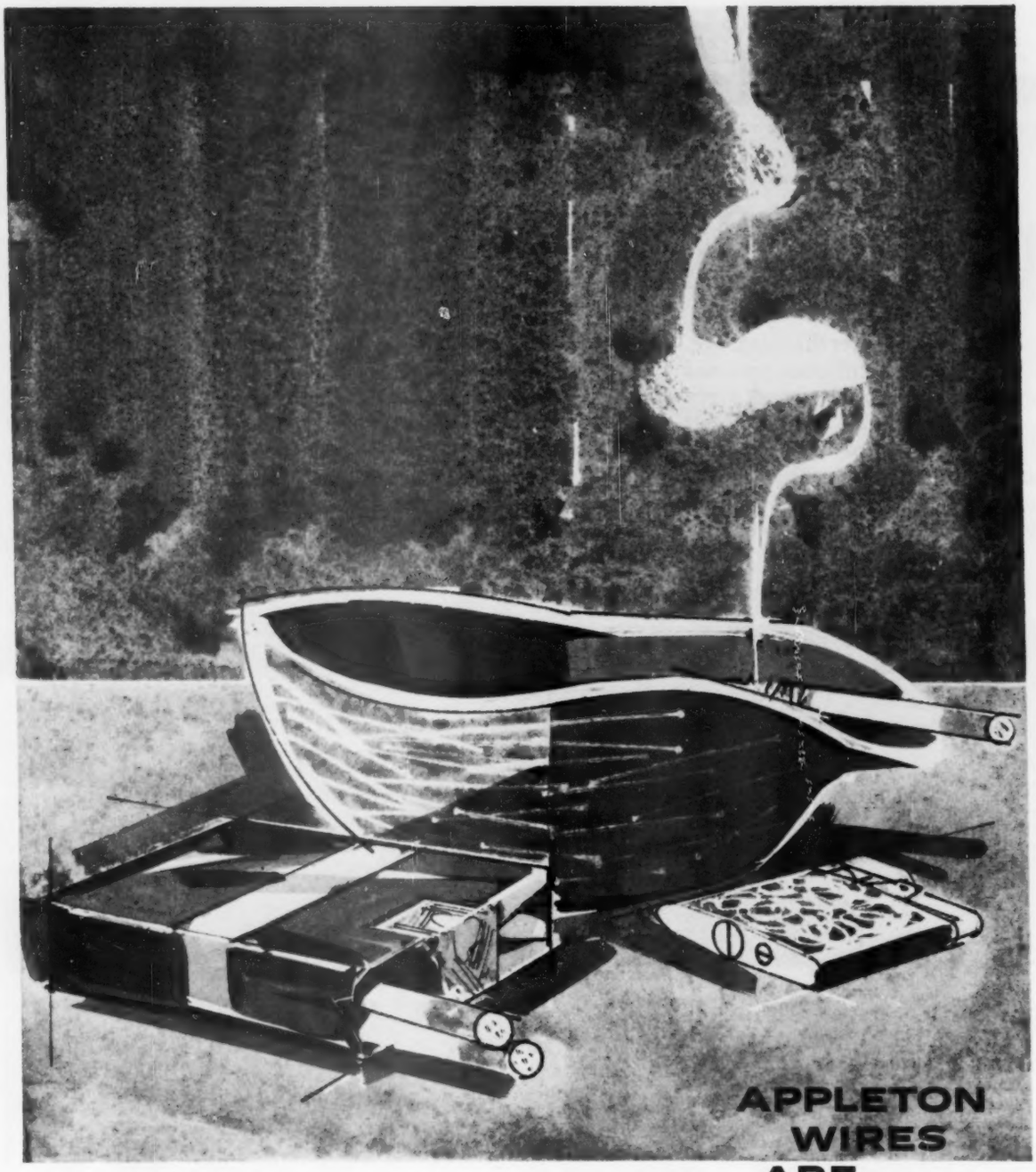
Beloit differential drives provide an accuracy of draw many times better than previously available. A common lineshaft located at machine-room floor level ties all sections of the machine together mechanically. This drive is unequalled for application to wide high-speed machines or special-duty machines where the problem of maintaining draw between sections of differing mass is important. Many mills have chosen to apply differential-drive units to sections where the draw becomes a critical factor, thus gaining the advantages of Beloit's differential arrangement without the necessity of adding a complete machine drive.



PATENTED DIFFERENTIAL

ACT! *Take advantage of Beloit's experience in the design and building of mechanical drives, each built in the Beloit tradition of fine craftsmanship. Write to Beloit Iron Works, Beloit, Wis.*

BELOIT
PAPER MACHINERY



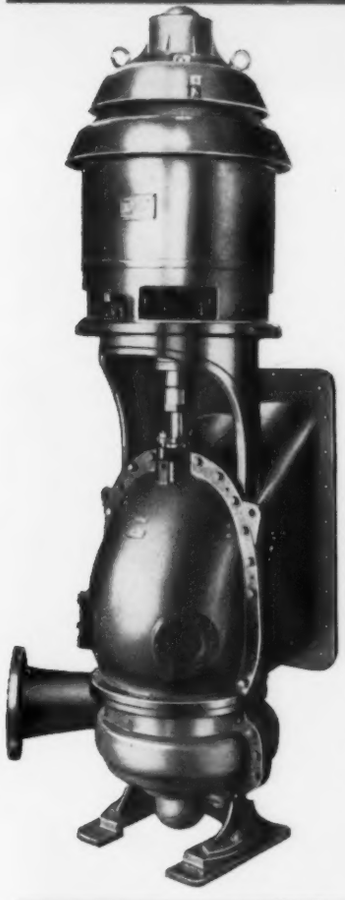
The delicate paper used for many major cigarette brands (most likely the one you're smoking right now!) is run on machines using Appleton wires. Whether they manufacture this fragile speciality paper or tough industrial sheets, particular paper people know that Appleton wires give them a longer, more profitable run for their money. Backed by 63 years of experience and the finest equipment that can be made, your AWW representative can suggest the Appleton wire that will prove profitable for you. Call him.
APPLETON WIRE WORKS CORPORATION, APPLETON, WISCONSIN

THE

Bingham "PULP HOG"

FOR DECKER, WASHER OR THICKENER

A STOCK PUMP THAT CANNOT BE AIR-BOUND!



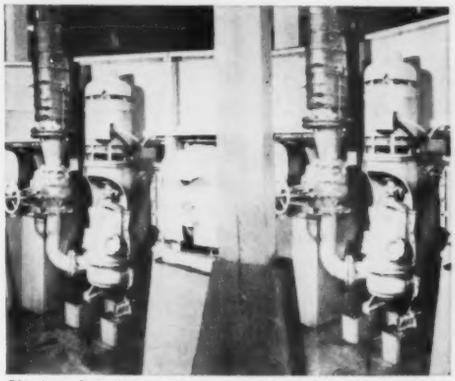
- HANDLES AIR-ENTRAINED PULP
- DISCHARGES PULP AT CONSTANT RATE
- UNINTERRUPTED FLOW INCREASES PRODUCTION
- RELIABLE PERFORMANCE UNDER ALL CONDITIONS

The *patented* Bingham Pulp Hog has been developed particularly for pumping stock containing large volumes of entrained air. This specially-designed pump takes stock from the doctor blades of Deckers, Washers, and Thickeners, and pumps it — without becoming air-bound or clogged — directly into mill system.

The Bingham Pulp Hog is characterized by a *large suction opening* and *non-clogging impeller of the top suction type. Impellers are specially designed to efficiently handle both high and low consistency stock.*

Bingham Pulp Hogs have records of *dependable performance* in major pulp and paper mills throughout the world. For more information call your nearest Bingham office or write for Bulletin No. 26.

- **Permits installation at convenient locations in mill flow line.**
- **Permits use of available floor space regardless of location of storage chest or other equipment.**
- **Operates successfully in basements or on any floor level.**
- **Eliminates need for dump chests.**
- **Substantially reduces building costs.**
- **Reduces operating heads, resulting in power savings.**



Bingham Pulp Hogs taking stock directly from Doctor Blades of Deckers, Weyerhaeuser Pulp Mill, Longview, Washington.

Bingham SINCE 1921

DOUBLE VOLUTE PUMPS RADIAL BALANCE

BINGHAM PUMP COMPANY

General Offices: 2800 N.W. Front Avenue, Portland 10, Oregon

Factories: Portland, Ore. • Vancouver, B.C., Canada

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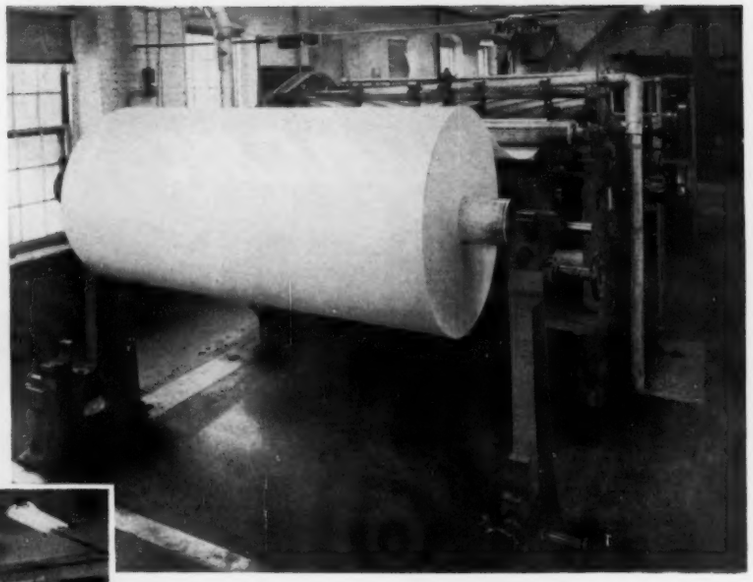

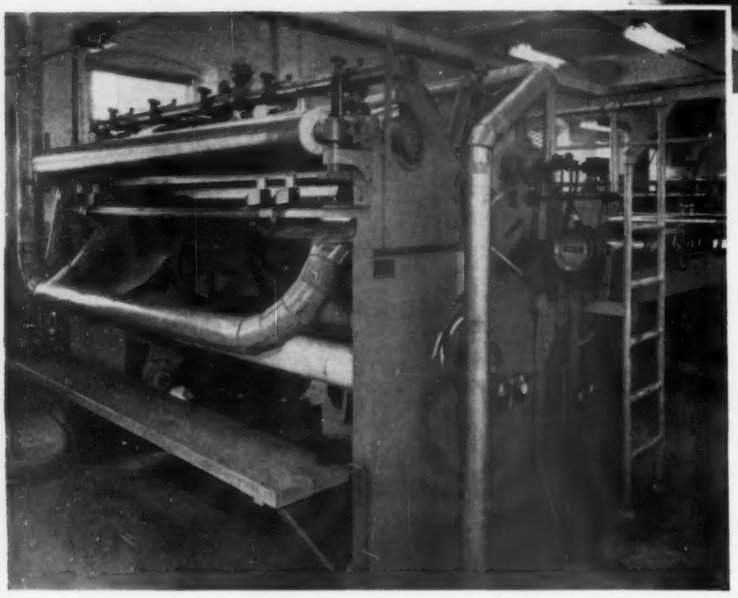

Clark-Aiken machinery—custom tailored to individual requirements—makes fast, efficient and practical automation a reality in your finishing room!

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Forward-looking management has been quick to recognize the benefits of practical finishing room automation. And they turn to Clark-Aiken, an acknowledged leader in the manufacture of paper mill machinery, to supply the solution to their specific production problem. Consult Clark-Aiken for immediate and considered attention to your finishing room equipment needs.

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"We have been using Clark-Aiken equipment for over twenty years with excellent results. Our new cutter was installed with a 100" trim paper machine and replaced another type C cutter which was not wide enough for our new installation. The new C cutter represents considerable improvement over the older type which we have had in service for a good many years. Considerably higher cutter speeds are possible and with the many adjustments on the machine extremely accurate sheeting may be achieved. We do not operate this particular cutter at high speeds, however, as it follows the paper machine on a three shift basis and the sheeting is watched very carefully for removal of any imperfect paper at this point.

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"We have always received excellent service and co-operation from the Clark-Aiken organization and can highly recommend their sheeting equipment."

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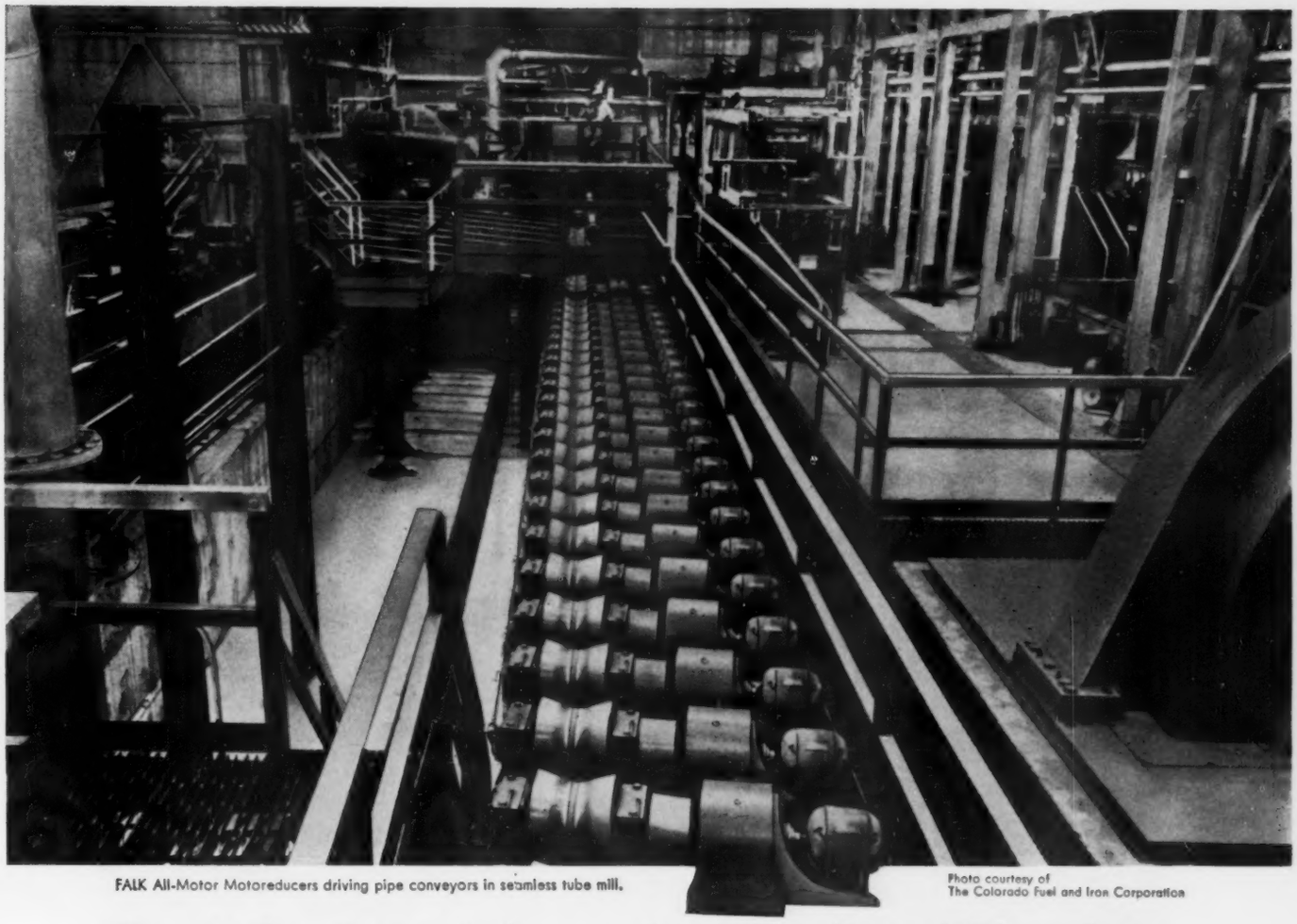

FALK All-Motor Motoreducers driving pipe conveyors in seamless tube mill.

Photo courtesy of
The Colorado Fuel and Iron Corporation

You get these "extras" when you buy FALK *all-steel* Motoreducers

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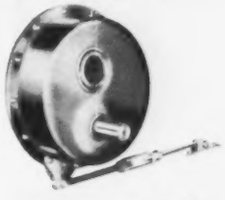

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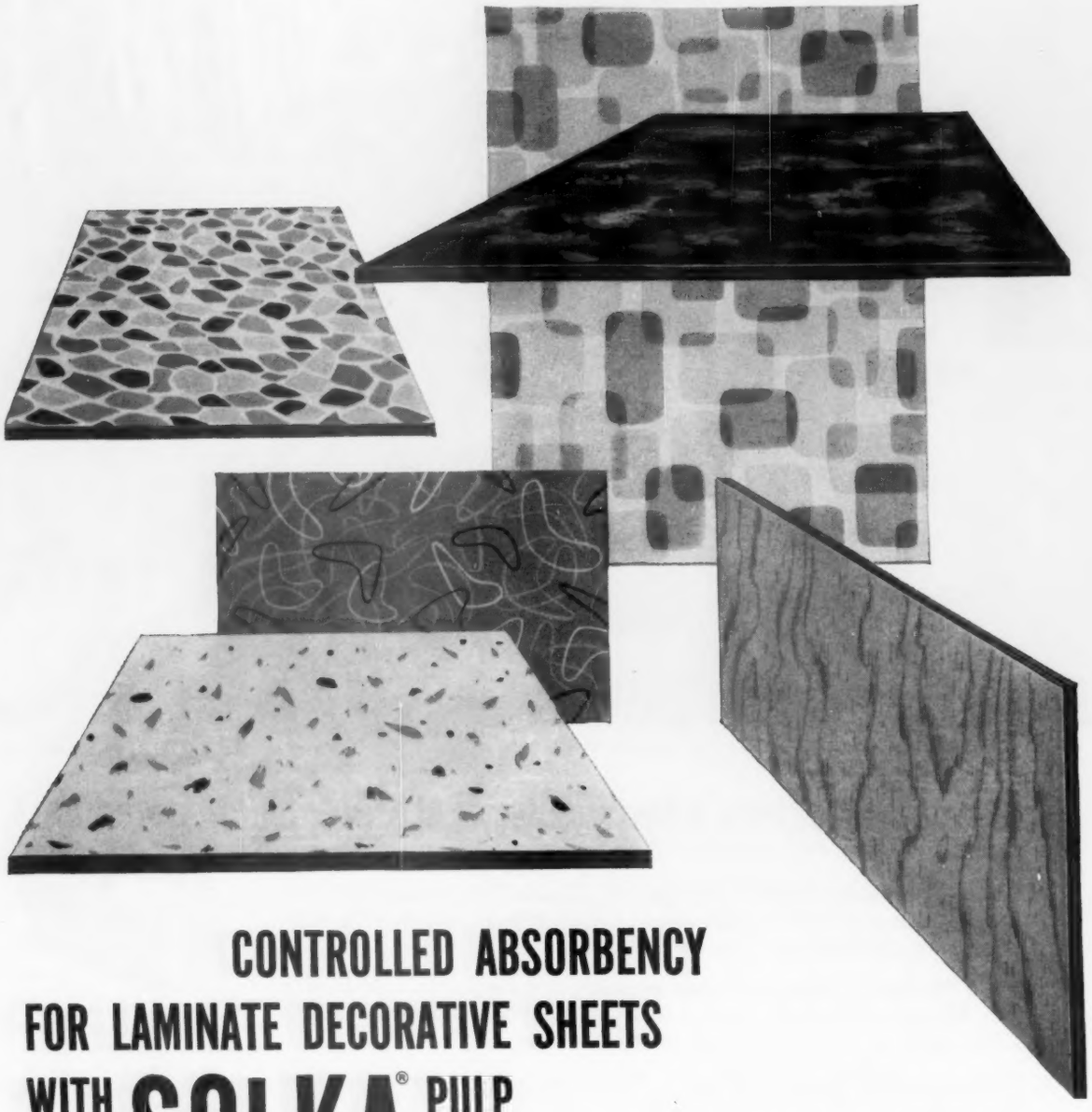

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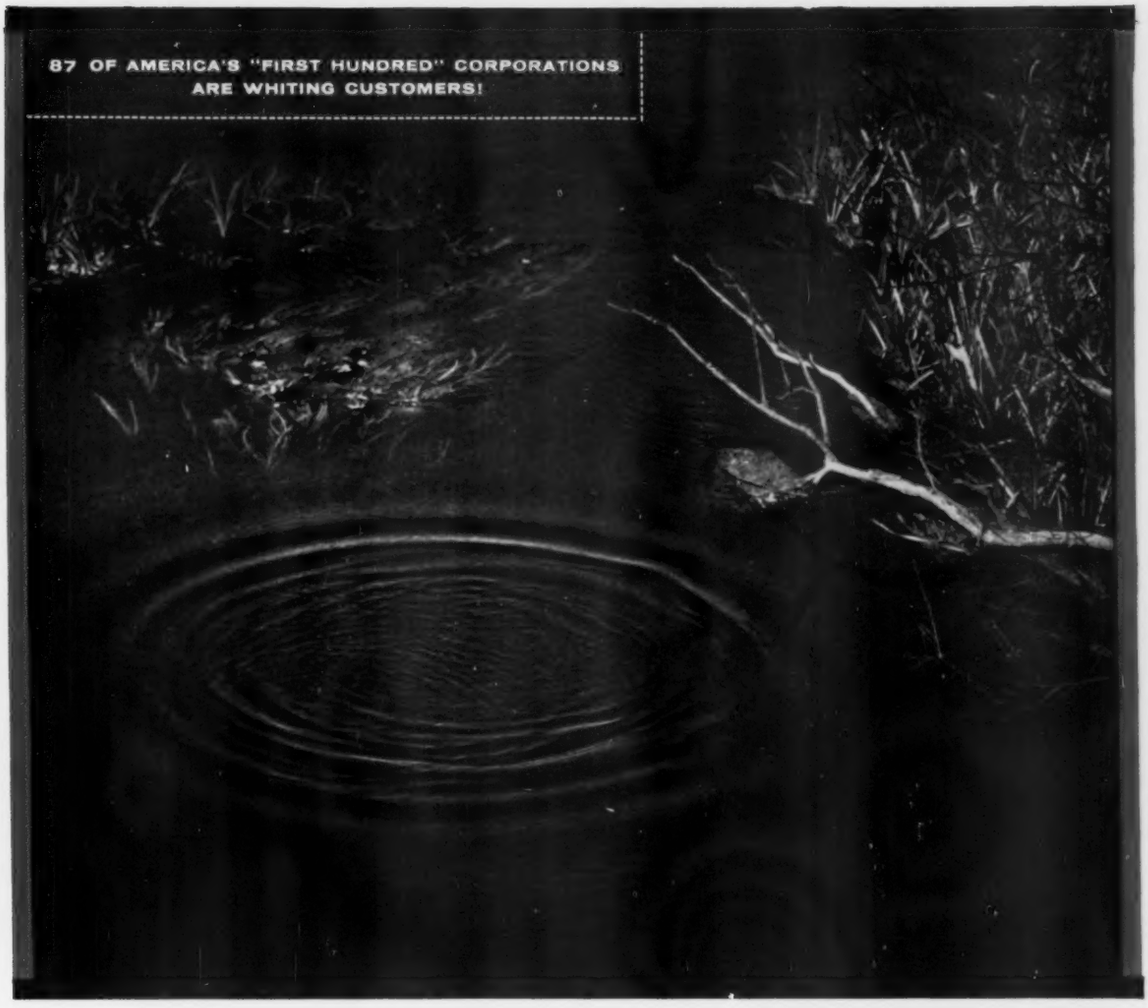

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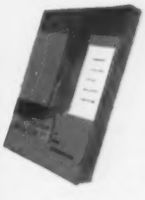

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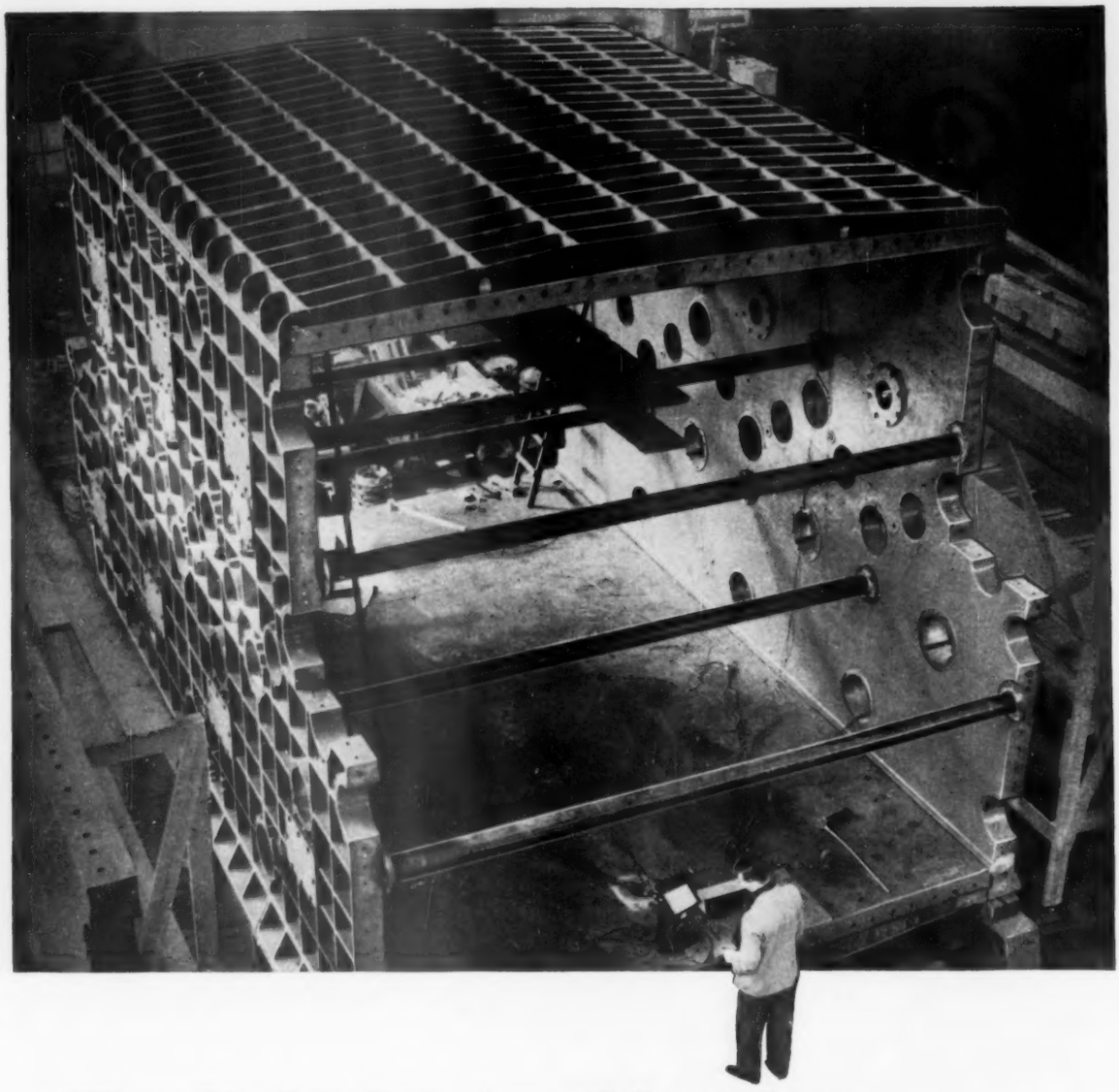
Wood pulp plant at Foley, Florida • Cotton linters plant at Memphis



The Pulp Drying Machine

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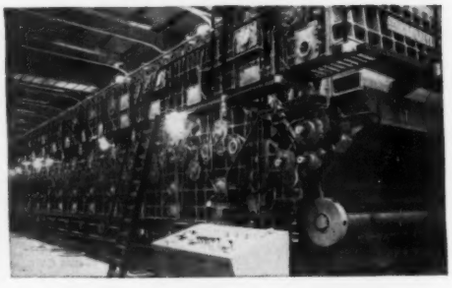

The strain gauge test, here being performed on a section of the vacuum chamber for the Dominion Vacuum Drying Pulp Machine, is typical of the modern methods employed by Dominion Engineering to ensure that its products maintain the high standard of performance established over the Company's many years of service to the Pulp and Paper Industry.

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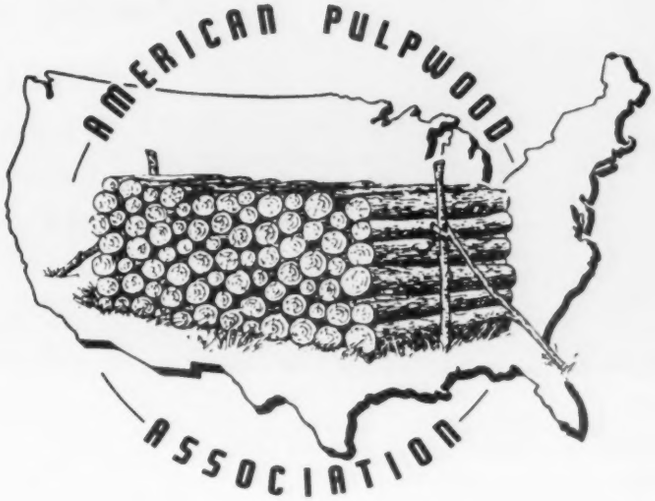
PULPWOOD ANNUAL

1959



Papers Presented at the
Annual Meeting of the American Pulpwood Association

Prepared by American Pulpwood Association
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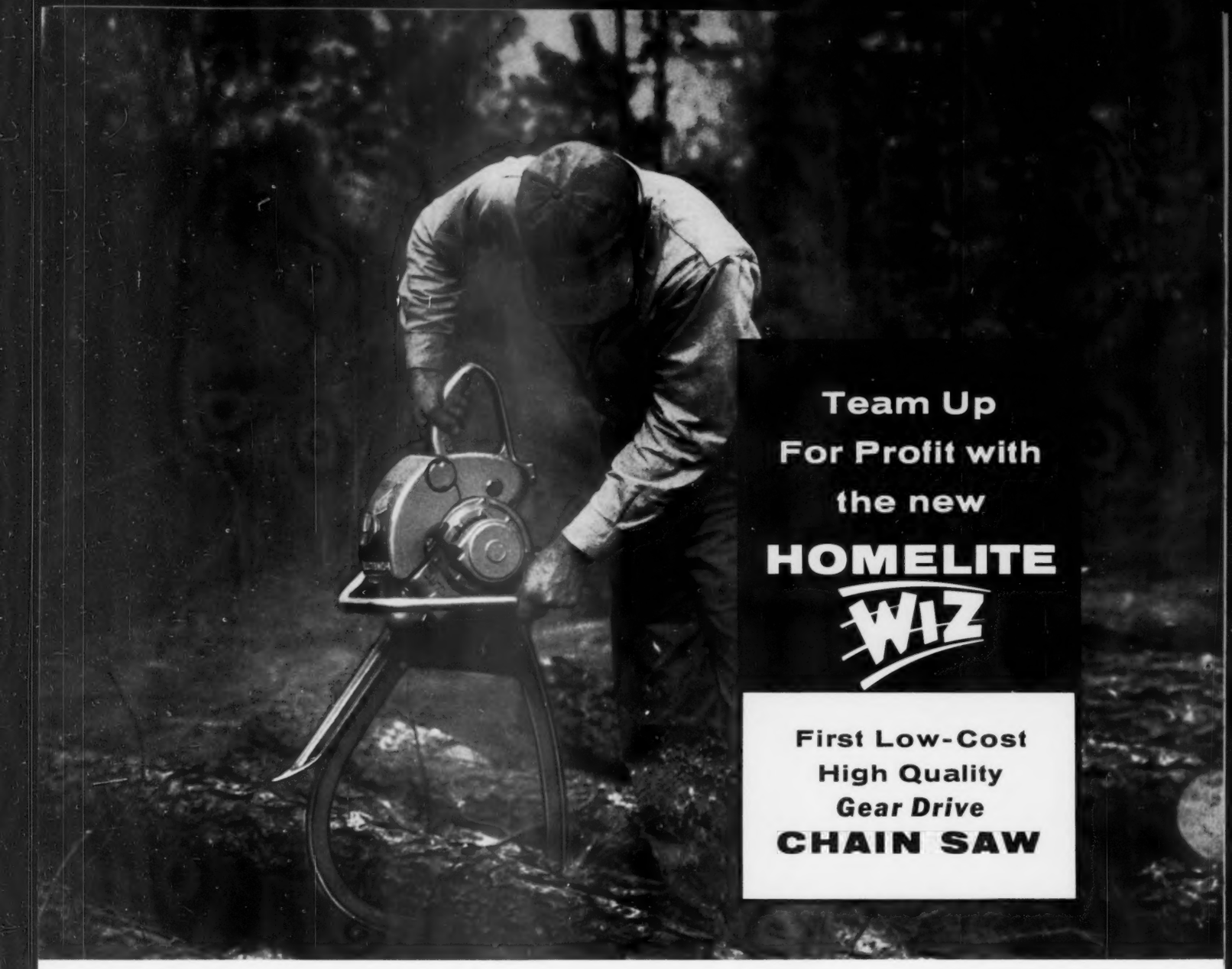

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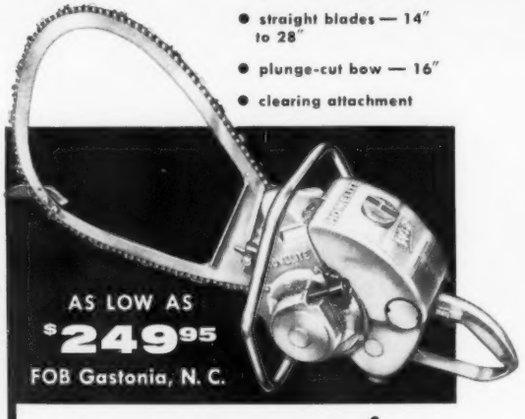

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PULPWOOD ANNUAL—1959

CONTENTS

PAPERS OF ANNUAL MEETING—1959

FOREWORD

Pulpwood activities were relatively stable in 1958. As this 1959 PULPWOOD ANNUAL goes to press, the rate of pulpwood consumption is increasing to an extent that should reflect greater activity and better business for pulpwood producers and consumers in 1959.

The papers and activities covered by this ANNUAL will do much to help us keep pace with an industry that is certain to progress, and which may be on the threshold of another surge in production.

These official papers, presented at the 1959 ANNUAL MEETING of APA, have been edited by PULP & PAPER, a Miller Freeman publication, as in previous years.

We appreciate very much their cooperation in making this ANNUAL available to our members and others interested in the Pulpwood Industry.

W. S. BROMLEY
Executive Secretary

Prepared by AMERICAN PULPWOOD ASSOCIATION
220 East 42nd Street, New York 17, N.Y.

Edited by PULP & PAPER
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370 Lexington Ave., New York 17, N.Y.

PRODUCTION PRODDER FOR PULPWOODERS!

The Oliver OC-4 is the perfect teammate for the husky OC-12 shown above. The OC-4 is compact, modern, speedy —a sturdy worker that's mighty popular with pulpwood operators. Features "Spot-Turn" clutch steering, 4-speed transmission and a full line of money-making attachments—dozer, winch, loader, fork lift, etc. Gas or diesel power.

Test the new "Spot-Turn" OC-12 in your own operations. Looking for ways to load out more pulpwood for less money? Then take a good look at the brawny OC-12—the crawler that's tops for skidding out big pay loads, dozing access and haul roads, building landings, clearing fire lines. The OC-12's tough, dependable power, coupled with its famous heavy-duty construction, makes it the champion cost-cutter.

Now Oliver has added something new and better! It's advanced "Spot-Turn" clutch steering as standard. You get even easier, smoother control, better maneuvering, less operating fatigue—more work cycles per day.

Ask your Oliver distributor to show you how the OC-12 with "Spot-Turn" can brighten your profit picture. Try it! Sit at the controls yourself! See the difference! Size for size, the OC-12 is by far your best buy!

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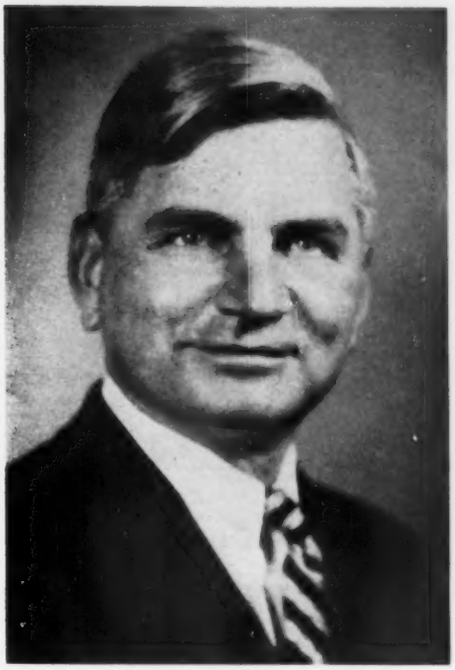
a complete line of industrial wheel and crawler tractors and matched allied equipment

DEDICATION



RUTHERFORD HOUSTON SPESSARD
1896 - 1955
President of APA 1936-41

The Association dedicates this issue of the Pulpwood Annual, posthumously, to its second president. "Major" Spessard was born in Virginia and graduated from Virginia Military Institute just prior to World War I. After leaving VMI he was engaged by Marion Institute, a Naval Academy and West Point Preparatory School in Alabama, to set up a military department. In this capacity he trained many young men who later became important names in military history.

He was among the first American troops in Europe during World War I and became the youngest Major in the AEF. His efficient performance won for him the Distinguished Service Cross and the Croix de Guerre. At the conclusion of his military service, Major Spessard was appointed Commandant at Marion Institute.

From the Institute he moved back to his native Virginia for a short while until the Florida building boom beckoned. He had considerable success there as a builder until 1927, when it became necessary for him to return to Virginia to assist his father in business. From this time, until his death in 1955, he operated N. E. Spessard & Sons. He was an active Producer Member of APA during this entire period.

In addition to his wife, Mathilda, a son Rutherford Jr., survives. The son, after graduating from VMI and serving in World War II, joined him in business and continued until dissolution in 1956.

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NEW FORD SELECT-O-SPEED

Greatest tractor advantage since hydraulics!

10 speeds forward; 2 reverse! Now, with Ford industrial tractors, with Select-O-Speed transmission you can shift to *any* speed under full load and on-the-go! A touch on the Select-O-Speed lever is all you need to select instantly the right gear to meet changing operating conditions. There's no clutching required to start, stop, change gears, or to engage or disengage PTO. There's no conventional gear shift. You merely move the selector for the desired speed. Hydraulic power does the work of shifting.

New Ford Select-O-Speed will save you time, save you fuel, save you effort. And because you can instantly shift up or down according to varying job conditions—on-the-go and without loss of power or momentum—you'll handle bigger jobs faster. Select-O-Speed transmission is available for all series of Ford tractors...

AND ONLY FORD HAS IT!

Eliminate four or five clutch

and gear shift movements every time you move from pile to truck to pile. A touch moves the selector lever to pre-selected stops for easy back-and-forth shifting. Down-shift on-the-go as you buck into the pile. Break out heaped payloads every time!

Down-shift in a wink

without loss of forward motion when you hit tough spots. As the load eases, shift up again for more speed, better fuel economy. Pull high spots into low ones with quick shuttle-type passes. Use Ford's low, low speeds for more "push" when needed, and for smooth, uniform finish work.

YOU SEE MORE FORDS BECAUSE THEY SAVE MORE MONEY!

Get full details on new Ford Select-O-Speed Tractors from your nearby Ford Tractor and Equipment Dealer today, or write to Industrial Sales Department, Tractor and Implement Division, Ford Motor Company, Birmingham, Michigan.

Panel:
Impact of
Recreation on
Privately Owned
Lands

PANEL PROBES IMPACT OF RECREATION in its many phases such as hunting, fishing, picnicking, camping, wildlife management and water resources upon lands of private forest owners. This was opening session of APA Forest Policy Forum.

What About Wildlife Management

The public must be educated as to its equity in wildlife on public and private lands; industry and public need to get together

By ERNEST F. SWIFT
Executive Director, National Wildlife Federation, Washington, D.C.

● History and tradition always have a great bearing on present conditions and reasons why people have developed certain attitudes. In general this knowledge will bring forth more rational and temperate solutions.

In the matter of public hunting and fishing in the United States, there are not too many who can trace its legal or common law traditions; some of which can be found in the old Greek law, the Roman, the Salic and the Magna Charta. In some instances, the public may have rights of which it is generally ignorant; but at least as often, the public assumes it has legal rights for which there is no substance. This is especially true in the use of lakes and streams. People also often assume that a continuing privilege becomes a pre-empted right.

In regard to history and tradition, I wish to quote from a paper I presented in Sept. 1958 to the anual meeting of the International Association of Fish, Game and Conservation Commissioners:

". . . The American Revolution, a physical combat between armies, started as a conflict of philosophies. The fact that the colonies insisted on representation in their government and equal opportunity for individuals with less social grouping, was the fundamental reason for armed combat.

"Wildlife Belong to the People"

"Out of this endeavor to guarantee equal opportunity came the premise that all wildlife belonged to the people. Every citizen had a real and valid equity in every wild animal, fowl and fish. Therefore, when a citizen acquired land, the title of the fish and game on that land was still held in trust for all the people. In other words, the landowner's equity in the wild game on his land was no greater than that of any other citizen.

"The colonies, when still under English rule, were passing ordinances which recognized this tenet—that a governmental body could protect land, forest and wildlife resources for the benefit of all citizens as one of its jurisdictional functions, regardless of whose land it affected.

". . . The New World philosophies of public ownership of wildlife versus the Old World traditions of the title of game going with the land were many. Trade in wild furs was one of the main inducements for exploration. Wildlife was plentiful beyond imagination and a necessary part of our early economy. Even bond servants rebelled against being constantly fed wild game. There would have been no America as we know it today were it not for the wildlife that sustained the then human populations. No doubt interest in hunting was also a gesture of defiance to Old World traditions where a rabbit poacher could be drawn and quartered for his crime."

Policy Prevails for Resort Owners

"Although civilization has changed the face of our land, the philosophy of making a living from public-owned property still prevails.

"A fishing resort invariably abuts a lake or watercourse and is in easy driving distance of other lakes and streams. Taxes are paid on a relatively small plot of ground where the resort buildings are situated. The stock-in-trade and the wares on the shelf for the resort belong to the public or some other private landowner. The lake and the fish are public property; if the resort stays open for hunters, they hunt on the lands of others. The scenery surrounding the lake or in the back country is either public domain or private ownership. Quite often it is an industrial forest; many times it may be federal, state and private forest. This land is usually used for hunting or hiking by the guests of the resort.

"So far as upkeep on these natural resources, which are 'sold,' is concerned, the resort owner pays nothing, unless he buys a hunting and fishing

license. He pays a property tax along with other property owners, but little of this seldom goes to support his chief stock-in-trade, forest, fish and game.

"Whereas a timber operator either pays stumpage on a land or a severance tax on the cut products; the resort owner pays nothing. So a private timber owner or farmer who allows hunting or fishing within the limits of his holdings is contributing to the success of the resort owner. However, the resort owner may point out that it helps furnish a market for the farmer and the timber owner. He also may contend that he contributes to the general economy of the community and state."

Public Has Two Sides

There seems to be a rather common complaint of considerable closure of private forest lands. This supposition is not borne out by facts; and in fact it is a myth. A recent survey by Charlie Gillett of American Forest Products Industries, Inc., proves to the contrary.

But who makes up this great mass of people—this public—that we are talking about? Actually, the individual wears two hats. As an ordinary citizen, he may work in a filling station, be a grocery clerk, own a barber shop, or be a bank president.

When he goes fishing or hunting he becomes a different person. Then he is looking for elbow room to indulge in his recreation. His station in life is not indicative of his attitude. He can be a respecter of others' property or he can be a vandal. He may be a fence-cutter or, if he is in a plantation that seems to have a million Christmas trees he may sneak one home in the trunk of his car. He wouldn't tolerate abuse of his own property, but may deem it all right to abuse others' property and the great out-of-doors in general.

But, let us put it more simply. We are dealing with human nature in mass, and with extremes in human nature. And the majority are responsible people. Although it may be more or less a joke in some countries to headlight a deer, that same person may very well shoot a lock off your gate or put a .30-06 slug in the carburetor of a bulldozer.

If the public is going to continue to hunt on private land, then by all justice the hunters should help police themselves. But many times that idea has not been too successful.

"Justification" of Trespass

A substantial portion of the public seems to have a built-in conviction that they have certain preferential rights on private forest land. There may be several reasons for this illogical attitude. The most obvious is they can be seen in open country, but aside from that I believe the forest land atmosphere unconsciously stimulates the pretense of emulating the pioneer tradition. Furthermore the average hunter can see no harm in his trespass, and private and public lands are often intermingled.

The least valid is based on a belligerence toward extensive forest land ownership and big industry in general, with the further fact that publicly owned game uses the land. This is all associated with a defensive attitude that trespass is justified.

The fact that there is a public equity in game and that it is managed for public benefit poses some real problems in the management and development of forest lands.

Let us use deer as a symbol for all big game as they are the most numerous.

Deer management has become such a controversial subject that any suggestion of a landowner's controlling them would cause an explosion that would make the Hiroshima bomb seem mild by comparison.

With deer hunting so popular and our present system what it is, the forest owner needs the hunter. The problem is to educate the sportsman to the necessity of herd control as a part of good game and forest management.

Along with this must be developed a sense of responsibility regarding fire. Proper education can overcome carelessness with fire. Vandalism is not a common trait of the majority but of the few.

HUNTING ON PRIVATE LANDS may be arranged by leasing privileges to responsible private clubs. Here are members of Taylor Deer Club in Arkansas ready to hunt on land owned by International Paper Co.

Fee Hunting

More and more I hear fee hunting debated as a justified practice for private forest owners. For the present I would say "no." It would be hard to enforce, questionable as to profit, and probably smaller kills where controls are needed. Also it would take only the resentment of an individual or two to cause fires, possibly not at the time of the hunting season, but the arsonist might be vindictive enough to touch off the woods in a dry season.

I have emphasized deer and big game because they have been a problem in forest mangement in many regions, but to attempt to collect a fee for small game and for fishing and not for big game on private land would be equally impractical.

Control of deer on forest land is a three-way proposition between the landowner, the hunting public and the game department or legislature which sets seasons and regulations.

The landowner wants one set of regulations—the public another—and the department is in the middle. Most seasons are on the conservative side, with weather being a factor in the kill.

Hunting and fishing on private forest lands may be something of a hairshirt to operators, but our philosophy of public hunting is not going to change right away, in fact there is increasing emphasis on it. Neither is ignoring it the solution or good for anyone.

Deer Management Survey

I have a few scars as a result of attempting to solve the deer management problem. Deer got out of hand in Wisconsin, my own home state. It became a flaming and burning issue.

About twelve years ago one of the most thorough investigations on deer damage to natural reproduction was carried on. It covered 1,500,000 acres, broken down into three units of 500,000 acres.

Standards for the survey were worked out by the Department in collaboration with the Great Lakes Experimental Station, and principally with Suren R. Gevorkiantz, now deceased.

The survey consisted of three-mile transects arbitrarily predetermined and spotted on a map. There were many crews, each consisting of a game man and a forester. The transects were chained and every so many chains a sample plot was established and a record made of the findings.

Two years were spent in developing the plan with specific written standards. The Experimental Station determined the acreage for sampling, the number of transects, allowable error, etc. A base of 500 stems per acre up to about 6 ft. in height was used. This is way under a good reproductive stock on an acreage basis, but it was felt that a low figure was better for the purpose of the survey. It was a case of leaning over backward to avoid criticism of being simply interested in sawlog forestry.

The crews were schooled and made many, many runs to get all the bugs out of the operation. The survey took another two years and 11,000 reports were made on it.

This survey definitely showed what many foresters had suspected, and that is that the actual figures of the survey showed that for every acre being burned in Wisconsin of the 1,500,000 acres surveyed, 500 acres of natural reproduction were being destroyed by deer.

Results!

Well, Wisconsin killed over 450,000 deer in three seasons soon after the survey, but the hunting public still did not want real management so some areas were overshot and others hardly touched. It also got me into the newspapers as a front man for the pulp and paper interests.

I recite this for one reason. Not one company came forth to defend me or to help work on the problem they were complaining about.

I was in Wisconsin this last December and I found that some of the large private forest owners were bitterly complaining about too many deer destroying both natural reproduction and plantations and that the state had better do something about it.

Where damage occurs you have to sit down with the state agencies and representatives of the hunting public.

Foresters talk to themselves but not to the opposition, hunters talk to each other but not to foresters, and to further stir the pot the resort interests, who capitalize on public property and the misguided purists, develop astonishing techniques for raising hell. There are also some state officials who have little stomach to stand up and be counted.

Industry needs some public relations know-how on a community level where there are deer problems and where the issue of what and how many animals to kill becomes an annual brawl.

By gradually educating the public on the relationship of deer to forests, many of the problems connected with public hunting on company land will be solved.

The next step is to develop in communities, and the public at large, an appreciation of the economic importance of forest industry and economy.

The public will always be the public—sometimes critical and sometimes emotional. The latitude the public now has on private forest lands is extensive but, in again pointing to your biggest headache, deer, I think the companies will have to take the initiative in a well modulated campaign of public relations.

And, whenever someone is willing to fight your battles—don't let him stand all alone.

Mapping Recreation's Growth

Surging demand can be met by increased multiple-use of privately owned lands; problem posed of establishing user charge policy

By IRVING K. FOX
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Washington, D.C.

● To say something worth while about the impact of recreation on privately owned lands and its relation to water conservation within a short time is a difficult task indeed. It is difficult in part because the subject has many ramifications, but this difficulty is enhanced by the fact that we have really given relatively little attention to national policies affecting outdoor recreation.

I will begin by reminding you of the over-all context in which we must think of outdoor recreation as it affects the use of privately owned lands in the United States. There are, I believe, two factors which are of paramount importance in appraising the impact of outdoor recreation on private lands.

First, thoughtful consideration of the demand for outdoor recreation opportunities which is now in prospect suggests an increase in demand almost beyond comprehension. Demographers estimate that by the year 2000 our population will exceed 300,000,000 in comparison with our present population of about 175,000,000.

Expected Spectacular Growth

However, during this period when our population will nearly double, other characteristics of the society we foresee suggest that the demand for outdoor recreation opportunities will multiply many times. The increase in urbanization, a continued rise in living standards, an increase in leisure time, the greater mobility of people, a longer life span—all indicate that this demand of which we are speaking will much more than double before the year 2,000. In fact, one recent estimate suggests a trebling by 1975 and my associate, Marion Clawson, has suggested that the demand for

outdoor recreation opportunities might increase as much as tenfold over the next 40 years. Thus when we speak of the growth of outdoor recreation demand we are talking about an extraordinary phenomenon.

A second factor of paramount importance is that during this period of spectacular growth in outdoor recreation activities, we must expect other rapidly growing demands upon our land and water resources. Cities, industries, and agriculture will multiply their demands for water supplies. Food, fiber, and timber requirements, together with highways, airports, factories and residences, will increase the demands upon our land resources.

Yet the acreage of land available to our use will not materially change and, barring a major breakthrough in weather modification or desalinization, we must continue to rely largely upon natural precipitation as the major source of our future water supply. This means in effect that the productivity of our relatively fixed land and water resource base must be multiplied in the decades which lie ahead.

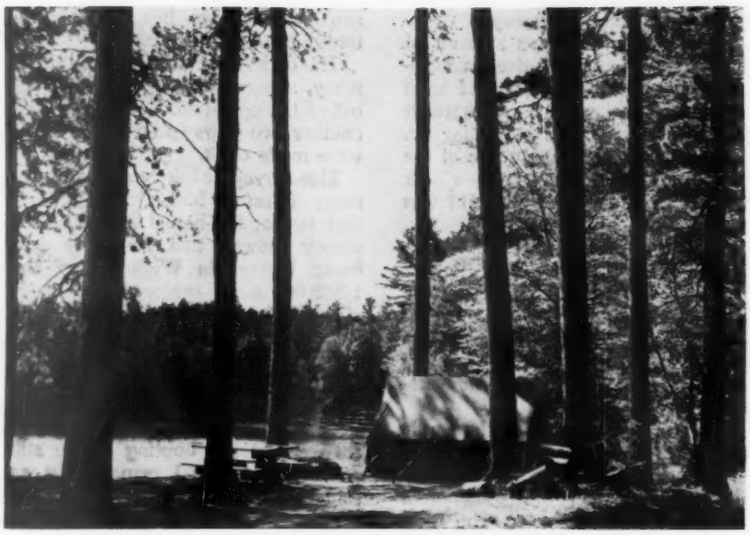
The need to multpily the productivity of a relatively fixed natural resource base is of central importance in establishing national policies governing outdoor recreation activities. Broadly speaking there are two ways in which we can approach the problem of meeting the tremendous increase in demand now in prospect.

One approach is to dedicate a much larger proportion of our land and water resources solely to recreation purposes. The other approach is to extend the multiple-use concept which conservationists have applied for many years so that lands which serve grazing and forestry purposes, and water which serves agricultural, industrial, and hydro-power purposes will be used to an even greater extent for outdoor recreation.

Must Rely on Mulitple-Use

If resources are dedicated to recreation alone, the potential productivity of our resource base will not be realized. In my judgment the magnitude of future demands upon our natural resources, particularly in the field of outdoor recreation, make it essential that we rely heavily upon the multiple-use concept to meet our future needs.

In expressing the foregoing conviction, let me make it quite clear that I endorse wholeheartedly the dedication of some of our land and water resource base to outdoor recreation purposes. I strongly support the maintenance and preservation of our national park system, national wildlife refuges, wilderness areas, state parks and other areas which are set aside for outdoor recreation and other specified purposes. Moreover, we will probably need substantial additions to these areas in the years which lie ahead.



ETERNAL LURE OF GREAT OUTDOORS beckons to more and more "leisure-happy" Americans each year. Burgeoning population growth is expected to boost recreation needs tenfold in next 40 years.

Nevertheless, I still feel that a major proportion of the future recreation demand must be met by more intensive use of land and water resources which are also used for other purposes. Obviously application of the multiple-purpose concept will make it necessary to dedicate less land and water to the sole purpose of outdoor recreation than othewise would be the case.

Much of the land which might be used for outdoor recreation in addition to other purposes is privately owned. The implications are clear. One is impressed with the extent to which private forest landowners are already supplying recreation needs as reflected in the survey a couple of years ago by the American Forest Products Industries.

It is gratifying indeed to see the number of acres of forest lands that are already open to public use, the number of public parks maintained by private companies, and the fact that the estimated number of visits exceeded a million and a half in a single year.

Privately Owned Must Increase

Yet I suspect that this is a mere beginning. When one considers that visits to state and federal outdoor recreation areas approach a half billion visits a year (not to mention the billion or more visits to municipal and county parks), that the national forests alone have about 60,000,000 visits annually, and that use is increasing at a rate generally exceeding 10% a year, we recognize that private forest lands now play a relatively small part in the total picture.

On the other hand, these privately owned lands are among the most valuable in the nation for outdoor recreation purposes and therefore have the potential for supplying a good share of the prospective increase in demand. Thus I suspect that potential visits to privately owned lands in the decades ahead should be counted in tens of millions annually instead of millions.

If this result materializes, recreation use of privately owned lands will no longer be viewed as an activity condoned by private owners largely in the interest of public relations.

The increase in outdoor recreation demand will be an important consideration in the development and management of water resources associated with privately owned lands. It will increase the pressure to maintain streams and lakes free of pollution. In the white water country in particular, some recreation groups will oppose even more strongly the development of impoundments which alter recreation values. In other areas we should expect that substantial investments in artificial lakes will be justified. In short, the private owner will be under pressures of an economic and political nature to manage the resources for which he is responsible in a manner conducive to the maximization of recreation values.

Basis for Decision

In dealing with the problems created by an explosive increase in recreation demands, there will be an urgent need for a valid method for deciding upon the extent to which any land—public or private—should be used for outdoor recreation purposes. Such a method should be designed to answer three specific questions: first, do recreation values warrant the withdrawal of specified land and water resources from other uses? Second, to what degree should recreation use of a given area be permitted to interfere with the productivity of land for other purposes? Third, how much of a capital investment in the development of recreation facilities is justified? In other words, what is our land and water worth to us for recreation in light of the other demands we are making upon our resources?

We see this general question in specific form in proposals to establish new park areas—such as the Allagash in Maine. This represents one type of impact of outdoor recreation upon private lands, namely, the pressure to transfer private lands to public ownership in order that such lands may be dedicated to recreation use. As important as this problem is, I will limit my comments to the impact of recreation upon lands which continue in private ownership. How much are privately owned lands worth for recreation in light of the competing demands upon these resources? What investments in recreation development are warranted? How should these determinations be made?

Owner Should Get Income

If we accept the premise that public use of private lands should eventually be many times what it is today, it is then only reasonable to conclude that the private landowner should receive income from the recreation use of his lands. This is a matter both of equity and common sense. The provision of recreation facilities, the risk of damage, and the interference with the productivity of the land for other purposes will mean that recreation use will involve costs.

Not only is the owner entitled to reimbursement for these costs, but income from recreation use will be essential as an incentive for the owner to permit recreation use to the extent warranted. Thus, as I see the problem, the question of determining the value of privately owned resources for recreation purposes becomes a question of determining how the private landowner is to be reimbursed for the recreation use of his lands.

One alternative is for government —federal, state, or local— to pay the property owner for public recreation use of his resources. Such a policy would be in accord with a widely held view that outdoor recreation opportunities should be available to everyone without cost.

Another alternative is for the landowner to develop the recreation facilities on his lands and charge users in accordance with market established prices. The question of which of these alternatives to choose and how to implement the alternative of our choice will probably be a major issue in resource policy during the period immediately ahead.

This policy issue poses some interesting subsidiary questions. For example, if public use of private lands is to be subsidized, how will the government determine the amount of payment to individual landowners? The difficulty of evaluating recreation has plagued us for many years. A policy of government subsidies would require some type of evaluation, even though a crude one.

A second important question is this: should one policy on user charges be applied to privately owned lands and a different policy be applied to publicly owned areas? It is evident that if user charges are applied to privately owned resources and not applied (or only token charges are made) for publicly owned resources, such as national forests, recreation activities will continue to be concentrated on publicly owned lands. Speaking in economic terms, this would mean that the publicly owned lands would tend to be over-utilized for recreation purposes and privately owned lands would be underutilized.

User Charge Policy Complicated

The way in which this issue is resolved will have an important bearing upon investments in water management for recreation purposes. If private owners receive negligible reimbursement for public recreation use of their lands, there will be little incentive to establish access to streams, to build artificial lakes for swimming, boating, and fishing, to lend their support to the control of pollution.

If government financing of public recreation is provided, a question arises as to who will supply the funds for capital investments and how specific decisions will be made as to what facilities should be developed. If investments are determined by the owner's anticipated returns from user charges, will developments be of the magnitude the public interest requires?

This is a complicated problem which warrants thorough study before a national policy is adopted. In order to arrive at an intelligent solution, I'd like to see a careful examination of the possibility of relying upon user charges to help determine the extent to which land and water resources—both public and private—should be allocated to outdoor recreation purposes.

In advocating such a study I'm aware of the problems such a policy would raise. The design of a system of charges and administration of collections would be no simple task. Certainly as a national policy, the scenic areas of the national parks should be available to all—and appreciation of these areas should not be precluded by high entrance fees. Obviously, the revenues that could be secured from the use of wilderness areas would never constitute an adequate measure of their value to the nation. The unquestioned importance of outdoor recreation to the physical and mental health of all people demands that a system of user charges should not preclude participation in outdoor recreation activities by any individual.

These considerations indicate that the design of an appropriate policy will not be easy. I'm quite certain that it means we cannot permit an unfettered market to be the only determinant of recreation values. Nevertheless, I think the market may serve a useful purpose. It is already being used to some extent in the outdoor recreation field. Wise resource management requires that the private owner be paid for recreation use of his resources. In the face of this necessity I hesitate to see us become involved in the manifold political and administrative problems which are certain to arise if public use of private lands is financed through government aid.

"JUST FISHIN'" in a public park at Weyerhaeuser's St. Helens Tree Farm.

Camping and Picnicking Use

Some ways to approach problem of public recreation on private lands; what facilities should be provided

By C. WEST JACOCKS
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● What impact may we expect if privately owned corporate lands are opened for public recreation? What may be the anticipated results of admitting hunters, fishermen, campers and people generally to enter and use these large wooded tracts heretofore closed to them? Is the reaction going to be good, or bad? Will goodwill follow or will it be a case of having a tiger by the tail?

First, we should consider if there is need, or reason, or obligation to add these facilities to existing recreational opportunities. An immediate answer would be that recreation is a tremendous force with us today; that it is steadily increasing in volume and in importance. Recreation, though it may have started innocently enough, now finds itself projected to the very forefront of our daily life and plays an important part in our economy. "Recreation is today's necessity," says Joe Prendergast of the National Recreation Association.

"Americans are spending half as much again for recreation as they spend for clothing or shelter, and twice as much as they spend for automobiles," says Fortune magazine in an article entitled "30-billion for Fun." This was in June 1954—no doubt the ante has been raised by now.

More and More People

Population increases, with which we are all familiar, play a major role in recreation planning. We are told by the U.S. Department of Commerce that 7,200 new people are being added to our population every day, a rate of increase that adds over 2.6 million people a year. This trend is a startling fact. The annual increase in U.S. population is about equivalent to the present population in the state of South Carolina.

And the rate of population growth in this country is on the increase. In recent years, the Department of Commerce has found its past estimates of population change to be low and has revised them upward sharply. It is quite obvious that more and more people will create a heavier demand for goods and services and other needs of all kinds, including recreation.

Population increases do not come from births alone. We are living longer, and equally as important, we are living longer healthier. A life expectancy of about 50 years at the turn of the century has been increased 43%. There are now over two million people who have already passed their 80th birthdays.[1]

A little arithmetic will indicate how many active years a man has left today following his retirement. A man plans, in his years of retirement, to do those things he has been waiting to do; and most of the desires include outdoor adventure. He is going to travel and see things. Tomorrow he will travel more—over a new system of federal interstate highways, that takes him further and faster, and also takes him into remote areas, heretofore unexplored by the camper and picnicker.

But it isn't just the man in his sunset years who is traveling. It is the workman, who finds his work-week growing shorter, his pay checks ample to finance trips over long weekends interspersed between vacation seasons; it is the boating enthusiast seeking new water courses; and it is the family on the go with their brand new outdoor paraphernalia. The open road beckons people of all ages and from all walks of life to the mountains, to the seashore, the creek bank and the forest quiet. The average man travels today about ten miles as far and ten times as often as he did at the turn of the century.

And let's not forget that this is a do-it-yourself age. Every participating sport is increasing; and woods and water adventure leads all the rest.

Needing More and More Space

It follows logically then that more and more people in the out-of-doors creates the need for more and more space for them to move in. A National Recreation Association representative has stated that we may expect the present generally accepted park and recreation standard of ten acres per thousand population to increase to twenty acres per thousand. He adds that state park departments will attempt to increase their total acreage by 25%, acquiring and maintaining forest areas, vast stretches of lake shores, river banks and rolling green belts.[2]

Not only is it necessary to provide more and more land for present and future recreational uses, but that land which is already in recreational ownership must be kept intact and protected from unwarranted encroachments. Every area possessing natural phenomena should be preserved and not abandoned to unwise developments and uses that would destroy their recreational potentials.

The "Vanishing Shoreline" report of the National Park Service brought out the alarming fact that there is mile after mile of shoreline in private ownership which cuts off public access to the beach. The survey revealed that there remained only a few tracts with sufficient acreage and natural value to qualify it for possible public park and recreation. These tracts should go into public ownership to insure beach recreation for future generations.

Dr. Erling Solberg of the U.S. Department of Agriculture recently advocated that cutover lands unsuited for farming be given to other uses, such as trees; and those areas having lakes and streams be zoned for recreation.

It is a hopeful circumstance that this need for expanded recreational facilities, including the areas themselves, has the attention of many groups—governmental, public and private; and that all are striving to meet the mounting demands.

Many are already familiar with the survey of the recreational uses of the forest industry timberlands and with the report published last year by the American Forest Products Industry, Inc. The report told of the millions of acres open for public hunting, fishing, camping, picnicking, hiking and other outdoor pursuits. It found a million-and-a-half people were using these lands for recreation, including hunting and fishing. This is a sizable contribution to the growing needs of the nation, and the survey makes it clear that there is a wide area in which industrial timberland owners, sportsman as well as other recreationists can cooperate.

South Carolina, For Example

To narrow the picture and get a close-up and more detailed study, let's use my state of South Carolina as an example state. It possesses all the necessary features to give findings that may be applied generally. This relatively small state—31,000 square miles—extends from the Atlantic Ocean to the Blue Ridge Mountains, and offers the recreation seeker practically every type of outdoor adventure—certainly it offers wonderful camping and picnicking, which is our immediate subject.

Somewhat hesitatingly I make the statement, that as of today, South Carolina presents a contrasting position to the national one, in that the people of the state—both the local citizenry and the thousands of visitors—are not hurting from lack of recreational areas. Facility-wise, certain expansions and improvements are needed or are desirable, but in general there is a satisfactory opportunity to all those seeking outdoor recreation in the state. The pressure of hunting and fishing is always present and additional game areas and fishing waters are constantly in demand.

Of course, the picture is changing throughout the nation and rapidly so. It is also changing in South Carolina. South Carolina has always been classified as a rural and an agricultural state, but it is being industrialized faster than any other section of the country. The cutbacks in cotton (over 2 million acres in 1918; less than ½ million now), tobacco and other farm products, leave lands available for cattle, and available for pine trees. The forests of the state, covering some 6 out of every 10 acres of land, comprise a large and valuable natural resource. Our woodlands provide the raw material for the state's second largest industry, ranking next to textiles.[3]

Of these wooded acres, it is safe to say that some half-dozen of APA members have ownerships close to 1½-million acres.

South Carolina's 22 state parks play host to more than 3 million visitors each year—and this in a state with only 2 1/3 million people. National forests and state forests, national parks, reservoir areas, and refuges, and certain large private holdings, add their areas to the total available for outdoor recreation. The seacoast is easily attained and the mountains offer unfenced and unposted stretches of wooded terrain.

There are reasons other than population increases and leisure time causing the increasing load on existing facilities. Families are moving to town in the face of farming restrictions and mechanization, or attracted by the lure of weekly pay checks from the new industrialized South, with its shorter work week, and variety of jobs. Many families are supplied with the ticket to town by men of means and by corporations with vision, eager to collect these acres that will grow a pine tree faster than any section of the country.

A HEARTY WELCOME is appreciated by the public. Well-kept campsites and picnic areas with access roads, water and toilets are some facilities to provide.

The old swimming hole is traded for a fancy pool in town, and this may be an improvement, but trespass signs and posted notices bar the entrance to many familiar woods trails and there is no more camping out in Mr. McGregor's pasture nor picnicking on the bluff.

So this state with its many wooded acres, its great rivers flowing from the mountains to the sea, its lakes, and its climate—a climate which enables a man to work 40 hours a week and then spend another 40 hours out-of-doors,[4] the year round—isn't going to be able to maintain its balance between outdoor recreation demand and supply without help. Tomorrow the public may need these forest lands of yours for picnicking and camping opportunities.

A Moderate Approach

But before an industry, such as the pulp and paper companies, opens the gates and says come one come all, enter and use, it might be well to consider a moderate approach. There are many agencies such as Boy Scouts, Girl Scouts, church and school groups, and others seeking sites for camping. Agreements could be entered into with these agencies and this limited use would serve a good purpose and take the load off other areas. Local churches and other organizations could be issued permits authorizing the establishment of picnic grounds and assembly areas.

This controlled use might gradually give way to more general use until the general public would have invitations. This should follow, if the need grows, for the areas no doubt have the potential of serving thousands, instead of hundreds.

Special privileges could be granted to neighbors, especially if the neighbors had a common boundary with you, and to families of company employes. However, any preferential treatment can quickly bring trouble and problems.

There are many miles of your holdings bordering on well-traveled highways. South Carolina does not have the system of roadside picnicking areas and parks as extensive or as well developed as many other states. Individual companies could consider the development of a series of such areas. These would prove a boon to the tired traveler and to the touring family. The cost would be modest and each area could carry a card bidding welcome by the company. Such areas and facilities, in addition to serving a definite need could also reflect favorably on the industry, and be a valuable public relations aid.

These uses I have described are only a beginning, and if started, I am sure would soon lead to a more wide-open policy, culminating in an invitation to the recreating public to enter and use.

Getting Land Ready For Use

How much would you have to do in getting ready for the public use? Let's consider briefly the facilities necessary for the use, maintenance, supervision, and an appraisal of public relation accomplishments.

Your public relations department would prepare the public for your announcement inviting them to use your areas for their outdoor recreation. They would prescribe the extent of these uses, define the areas available and the facilities being provided; make

statements regarding charges, if any; and ask the public's cooperation and caution them against fires.

The first facility needed would be an access road leading to the use areas and a parking space at the destination. Picnickers and campers are going to build cooking and warming fires; they are going to need water, and latrines or toilets must be provided. In addition, campers are going to remain overnight; and campers and picnickers should not be mixed, but have separate areas entirely removed one from the other. The campers, therefore, should be placed in the more remote areas; the picnickers closer to the beaten path.

Care should be exercised in selecting sites that are shady, well drained and open enough to permit air circulation. Sites adjacent to waterways carry a premium. Boat launching ramps at lakes and navigable rivers are most welcomed by the growing army of boating and fishing enthusiasts.

Drinking water can come from several sources. Deep wells, with pressure flow are most desirable. They are also the most expensive. I would not recommend this facility except in large areas where constant supervision would be possible. Springs are available in many areas, and offer good water. This water should be protected by being boxed in and locked, with only a flow pipe open. It must be tested for purity at frequent intervals. A third alternative is the shallow well with hand pump. Many campers will bring their own drinking water, and use the supply at the site only for cooking and bathing.

The type of sanitary facility to be provided depends on several factors. A flush toilet would depend on water supply. It is most preferable, but is costly to install and maintain. A well-constructed, pit latrine would prove an inexpensive and acceptable substitute.

Provision will have to be made for removing garbage and trash. Providing containers will not eliminate a clean-up detail, for there are always those among the public who are poor housekeepers. In heavily used areas there may be sufficient food disposal to make it worth while to provide separate containers for trash and for food waste and for some nearby farmer to collect garbage for feeding to pigs. Aesthetic consideration would have to be weighed, of course, and also, any applicable regulations concerning sanitation, health and safety.

In wilderness areas, honest-to-goodness campers will burn their trash, bury their garbage and dig their own latrines.

Supplying Firewood

The spirit and magic of fire appeals to all outdoorsmen. Fireplaces, grills and pits should be provided so as to have all fires safely confined. Necessary for fire is firewood. It may be worth the effort for the companies to gather and place small stacks of firewood at the sites. Otherwise campers will gather their own firewood as long as the immediate vicinity offers a supply, but after this, small trees will fall before the axe. Here again, though, many campers will have small portable stoves using white gasoline or bottle gas for their cooking.

Lean-to's and sleeping shelters are not popular in the South, and will be used only by some Boy Scouts or hikers. Nearly every camper today has his shelter with him; also his bed. Few trailers would seek out the areas in your preserves, unless there were special features. Youth groups and family campers will come with their canvas, their covered wagons and their Rube Goldberg camping inventions.

Tables will have to be provided in your picnicking areas. In camping areas they would be helpful but are not a necessity. There are standard types of tables available, both portable and permanent, with benches attached. Treated timbers, other than creosote, should be used in the construction of the tables.

Picnickers come to the sites in automobiles, and can get under cover in the event of sudden showers. However weather shelters are nice facilities for heavily used areas or for areas where there are large family gatherings, reunions and similar assemblages. Shelters with fireplaces have added advantages. Shelters with dirt floor are never satisfactory.

Shelters are considered a luxury in camping areas. Although many campers would welcome their convenience, they are not necessary to a good camping area.

Supervision and Maintenance

The areas will have to be supervised, policed and maintained. The supervision should be of a personal sort, as you are desirous of building good will, appreciation and gaining friends and supporters.

Gear your construction to a type of minimum maintenance. Have construction quality standards that will evoke pride from users—it is cheaper in the long run.

All areas must be clean. If the public abuses them, you will have to clean up after them. If this is not possible it may be best to close and abandon the areas. Cleanliness is essential.

The public is gradually improving its housekeeping methods. The "Don't Be a Litter Bug," "Keep America Clean," and Smoky Bear campaigns are helping. The weight of laws prohibiting the throwing of trash on highways and garbage dumping is being felt. Groups such as garden clubs have been doing their part in nature appreciation for years. The camping fraternity through their own associations are promoting good practices with increasing success. All this helps.

Public Is Appreciative

The public as a whole will appreciate the generosity and cooperativeness of the landowners in opening their tracts for recreational activities. Many will demonstrate this feeling. You can except a small percentage of the users to do most of the things you do not want done. These are in the minority and there is no escaping them anyway. They are the type who would visit your areas and impose their ill practices even more readily if the areas were posted against them. On the other hand, those seeking recreation in the out of doors, as a class, are a decent set and their presence alone helps offset the bad influences.

I would emphasize the policy of sound planning and construction; a minimum of "don'ts" in regulations, emphasizing the positive rather than the negative; and as much good personal relations contacts as possible.

I think it entirely in order that, when and where practical, signs, exhibits and displays tell of the work, purpose and policy of the company that is making the area or the facility available for use by the public. Try to bring your visitors into the family circle; get them conservation minded, and constantly promote an appreciation of the values of our natural resources.

You have a big stake in this country of ours; you now own and control many areas that were recently in small private ownerships. Most people welcome you; some see you growing fat on a land that was only a lean yield to them; and they chafe under a feeling of defeat. You must win them over if possible; you may gain friends by being one.

You have a big stake in this country of ours and in the future of recreation. Recreation is a big and growing business and rightly so—and big business is justifiably in the field of recreation.

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[1]NEA Press Release Feb. 1959.
[2]Robert L. Harvey, Recreation Magazine, Jan. 1959.
[3]Chas. H. Flory, S.C. State Forester, Jan. 8, 1959.
[4]Dr. Harold F. Clark, Columbia University, Aug. 1948.

All-Resource Land Use

"Multiple use" is often only many layers, but "dominant use" is based on sound policy plan to give proper priority in land use

By ARTHUR H. CARHART
Author
Denver, Colo.

● Words are carriers of thoughts and ideas. With the staggering number of words found in our unabridged dictionaries, the multiplicity of combinations in which you may use them, you never can convey exactly to listener or reader the thought or mental image in your own mind. Even a single word often will produce quite different mental pictures in each of several minds.

Take the word "forest." To a timberman it certainly means stands of useful tree species ready for harvest or growing toward that goal. But a very different chain of thoughts comes to an ornithologist, a deer hunter, state publicity man, women's club or mountain climber when they hear the word "forest." And certainly forests mean something of very great and rare value to every one of these and most other folk.

There can be no question as to what the head men of wood-using companies had in mind when they bought lands now in those well managed forests that industry owns. Those forward-looking officials were fortifying their position in the future of business by purchasing the ground on which they could grow at least a fair volume of that raw product known as wood.

The company forests, large or of lesser size, were bought for one primary purpose—to grow wood. That's it; that's the primary goal of their owners.

During the past few years I have had the opportunity to meet some leaders in the pulp and paper industry. It would be stating it too strongly to say that these officials were feeling a touch of stampede as other uses inherent in forests came slamming into their business orbits, demanding recognition. No, their reaction wasn't quite stampede. But when these men faced up to the fact that their forest lands contained paramount watershed values, that those lands grow species of much-sought game, that their forested hillsides deliver good water to important fishing streams, and that other people, thousands of them, come eagerly, determinedly to the forests to enjoy the woodsy surroundings—I do believe when executives faced these facts, they were what has come to be known as a bit "shooken up."

Forest Is Ever-Changing

A forest never is a one-value, one-use property. It is an ecological complex. It is ever-changing whether it is allowed to work out those changes only as natural law may dictate or the changes are imposed by man's actions. And a basic truth concerning this complex community we call a forest is, that any appreciable change in any segment of the whole has impact, often of considerable magnitude, on all other segments.

Then arise problems involving other than those specifically belonging to the wood-using industry.

For example, block cutting of a timber stand, the upsurging of new growth, produces the finest sort of environmental conditions for deer. Under such circumstances the herd is likely to snowball in population until its foraging becomes a serious threat to the resurgent young forest. Later the tree crowns have lifted above the reach of deer, the under story of shabby plants has been killed out by shade, the carrying capacity of the area for deer tumbles to a fraction of what it had been, and either there is adequate harvest of animals to balance range and herd numbers or there is a spectacular die-off of deer.

The next impacts that might follow block cutting could bring more troubles. Almost unvaryingly, hunters will oppose the reduction of she-stock in the deer herds which is the means of checking explosive eruptions in population. The herd will go into the period of swiftly lessening browse as tree crowns lift higher, with too many animals desperately over-eating too little of deer foods. The forest no longer has abundant "edge," the browse type, of deer food.

Whether the deer move out, starve or nature resorts to other means to reduce numbers, the size of the local herd shrinks, often drastically. About that time some pool-hall biologist starts yelling that it's all the fault of "the company." Didn't "the company" pressure officials into having more liberal hunting—and didn't that "kill out our deer?"

Land-Use All Inclusive

No more plaguing problems are being faced today by those responsible for management of industry forests than how to best handle the other-than-wood values in their forest complex. Others have discussed specific problems such as game produced from forest properties, the over-topping problem of water collection and delivery from timberlands managed for optimum wood protection, and facilities for those hungry for woodland recreation have been well presented.

These are subdivisions of a whole management unit. To leave them standing as separate areas of concern and action would be dodging the driving fact that all these, and wood growing also, are insolubly interlocked in all-resource, all-use planning and management of any forest. It is my chore to at least open the way to thinking of inclusive land-use planning as the best means of lessening disruption of timber production by other values and uses, and at the same time, secure the greatest return from all resources of the company properties.

Before we examine what basic land-use planning may offer, I should like to stress the importance of the watershed phase of forest plans and management. Here is the most positive potential for the greatest interference with company goals and those of their staffs primarily concerned with producing wood to meet company needs.

Water Is Most Important

No minute or extensive examination of the facts is required to establish the truth that of all the values that exist on any forest property, the collection and delivery of water is the most important to people. Though wood and its products are of extreme importance in our economy and society, most functions, perhaps all functions, supplied by wood can be performed in varying degrees of success by substitutes. Perhaps the cost will be greater, the efficiency no

FISHING DOES NOT INTERFERE with the "dominant" use—tree growing—on this public fishing site on a tree farm in upper Michigan. Industrial landowners cannot afford to forget that dominant use should prevail.

higher, than if wood is available but you can get along without wood—at least for a while you can.

But you cannot live without water. Your body has to have its 6 to 8 pints of moisture replacement every day. Each day there are 1300 gallons of water in service of some type, to underwrite your daily living.

No more vulnerable spot exists in the whole array of coincident values and uses in a forest than this function of water collection and delivery. To brush aside considerations of management to protect this value, to say, "Go away, you!" as you would shoo off a tramp cat, simply will not suffice. You better face it—if you don't do the best practical job in maintaining watershed values on your properties, some loud-voiced politician can rise up, and start shouting, "They are damaging our watersheds! Their cutting practices are ruining our water supply! Take this land away from these people; protect our community's future; stop the cutting of timber and ruination on our watershed!"

Get the right set of conditions and that can happen—disastrously.

Cutting Can Help

The best possible defense against such a crazy but rampant assault against private ownership of your forests is to give a hard, direct look at this watershed wealth you have on your property. Then do the best possible job of managing the timber to insure the best possible watershed management compatible with sound timber management.

Actually, you may know that some patterns of cutting lodgepole pine have increased outflow from watersheds in the Fraser (Colorado) Experimental Forest. And though I cannot here array data to prove the point, common sense argues that lusty young growth coming in after either block or selective cutting is best protection of water-collecting slopes one may get.

The best defense against this "Take-the-watershed-away-from-'em" hysteria, is to plan, diligently, expertly, coordinate management of watershed and timber production—and be so far ahead of any agitator in both plans and performance, whatever he may shout loses all of its thunder when it crashes headlong into truth. Certainly a forester is one of the most able men to plan the best program for the timber wealth in a watershed. He can have a most valuable consultant associate in a specialist with top skills in watershed management and production practices.

"Geoecologists"

This man should not be the water engineer; the engineer is concerned mostly with dams, canals and conduits, putting water to use after collection and delivery. He is expert in construction devices that channel water into various uses. Rather this specialist would have basic training in geology, also in biology, certainly with enough forestry to know what his forester associate might be trying to achieve in forest management. Maybe an appropriate name for this man would be "geoecologist."

His knowledge would embrace the underlying earth structure, the soil, its major types and divisions, and the things that grow from the soil—all with relation to water collection, percolation and delivery to down-country uses and users, and all in a coordinated program of growing timber.

Something of the same relationship exists with regard to fish and game. A qualified consultant could aid and protect a company in planning integrated management of wildlife with sound forest management. Even more emphatically the recreational use must be approached and worked out in a similar all-inclusive land-use planning.

"Multiple Use"

Before we go deeper into this all-resource land-use planning let's discuss a combination of two words that have as many interpretations and meanings as "forest" has. Let's examine the term "multiple use."

When this pair of words first was applied to the utilization of natural resources it carried the idea of each value or use being integrated in the whole scale of such uses and values, so the combination of all achieved the highest, sustained yield of wealth from land and waters. More recently, in practice multiple use has degenerated into what amounts to layering.

Actually we have this result in many cases of "multiple use" plans: The forester makes his plan for a unit of his forest. The grazing man makes his plan and slaps it across the unit. Maybe a watershed expert comes along and without regard to other plans makes up his and layers it on. Then the game and fish agency that, as in other phases of the whole has little regard for anything but wildlife, adds a wildlife plan. Finally the recreationist and the tourist publicist spread their schemes for use and promotion over the unit, at least on paper, as if no other plans preceded them. The plan that finally gets priority is the one made by the fellow who has the loudest shouting voice and the highest rating civil service or whatever his employment agency may be.

This isn't systematic land-use planning; it's brawling between specialists.

As some of you know, it was my privilege and burden for four years after World War I, to be the first regular employe of the U.S. Forest Service with training as a landscape architect and city planner. I was engaged to study and plan recreational uses in the forests of Region 2. Even that early, even as it was forming, multiple use was taking on the pattern of layering—of the most vociferous proponent's plan being the one getting the priority and appropriations. I sought another terminology to better express the concept that was originally attached to multiple use. Out of somewhere, in a conversation, through

mental searching for words, through some avenue, came the term "dominant use."

I offer it as a more definitive term for methodical land-use planning than multiple use now is.

"Dominant Use"

The determination of what I've called the dominant use is a first step in inclusive land-use planning. We have an excellent illustration of dominant use in the industry, company owned forest. The land was brought to grow wood. Of course! And the dominant use of that land is, and should be maintained as such, the production of wood.

In the field of recreation planning, to offer another example, preliminary survey of a master planning unit might show the area as having exceptional physical make-up to serve as a horseback and pack-outfit territory. Or it might be canoe country, as in the Superior National Forest. Or picnic and summer home types of recreation, as in the Angels National Forest of California, the White Mountain Forest in New Hampshire.

The dominant use has full priority in land-use planning. It may yield to a secondary use-value at some points, such as a well-planned campground being No. 1 use on 10 or 20 acres within a 100,000-acre master-planning unit, but over the whole area the dominant use is dominant. Over long-time periods this may be modified or changed. Sound land-use planning must be reasonably flexible to meet changing conditions.

"Compatible Use"

Bernard Orell of Weyerhaeuser applies a very appropriate name to other-than-dominant uses. He calls them compatible uses. This implies a lot of the meaning of the graduations of priorities among other uses after the dominant one is defined. Their position in the planned sequence of their part in the inclusive plan and management program depends on the value and type of contribution they may make to the whole-use program without their materially interfering with the dominant use.

Planning all-use, all-resource programs for the industry forest, or for any forest, is a systematic task. It takes into consideration all possible values that should be weighed, appraised, and combined into the master plan in right relations to other values and uses.

As I have seen recreation demands met on industry forests, I have gained an impression that what's been done has leap-frogged over two of the most fundamental phases of all-resource, all-use planning. When pressure to allow hunting and fishing into your properties has hit, you've let in sportsmen, as a phase of public relations. Hunting and fishing your lands produce have been regarded as nuisances. You get sportsmen in, and then out, as smoothly as possible. You do it to be "nice guys." To create good-will.

This has paid off and you know it.

Similarly, when pressure to open some areas for camping has been felt you permit it to create good-will. But campsites have been stuck into the forest not as a part of a long-range, coordinated all-use plan but dabbed-in as unrelated units because someone, on a sunny day, thought it would be nice to have a campsite at a certain spot.

You would tolerate no such hit-and-miss, stop-gap, under-pressure management of your principal resource, timber. And if that sort of stuck-in development in human use of forest recreation resurces is followed very far, those spur-of-the-moment campgrounds will be headache makers, for sure.

Policy Plan Comes First

The two steps in sound planning that are hurdled when you listen to a local service club delegation to put in a campground at a location one of their members has selected or sportsmen wangle access to your game lands, are the policy plan and the master plan.

The policy plan starts with something like this: You have these values on your lands; recreation, wildlife, watershed. People are going to demand these values be made use of. All right—what are you going to do about them? Handle these on a public relations basis; foot the bill? Are the demands of people or groups outside your organization shoving you into doing something to utilize these resources? Or are we going to consider these values assets and start now toward insisting they shall be handled as such?

(Let me interpolate this: Because the recreational uses came in via public relations, the problems they presented have been handled as public relations rather than assets. Make no mistake—I've seen the highest type of public relations handling of these problems by your staff men, and all they have done is ground gained. These alert PR men can be of even more value, if companies begin to handle "compatible resources" as assets. They can get a lot more good-will if the company is leading the parade in planned utilization than if popular demand pushes the company into allowing hunting, fishing and camping.)

When you get right down to establishing the policy plan it may be the policy to try to keep all visitors out. It may be the policy to utilize the "compatible" assets and at least make their use pay its way. The policy plan must precede master planning. Otherwise you're adrift.

Then the Master Plan

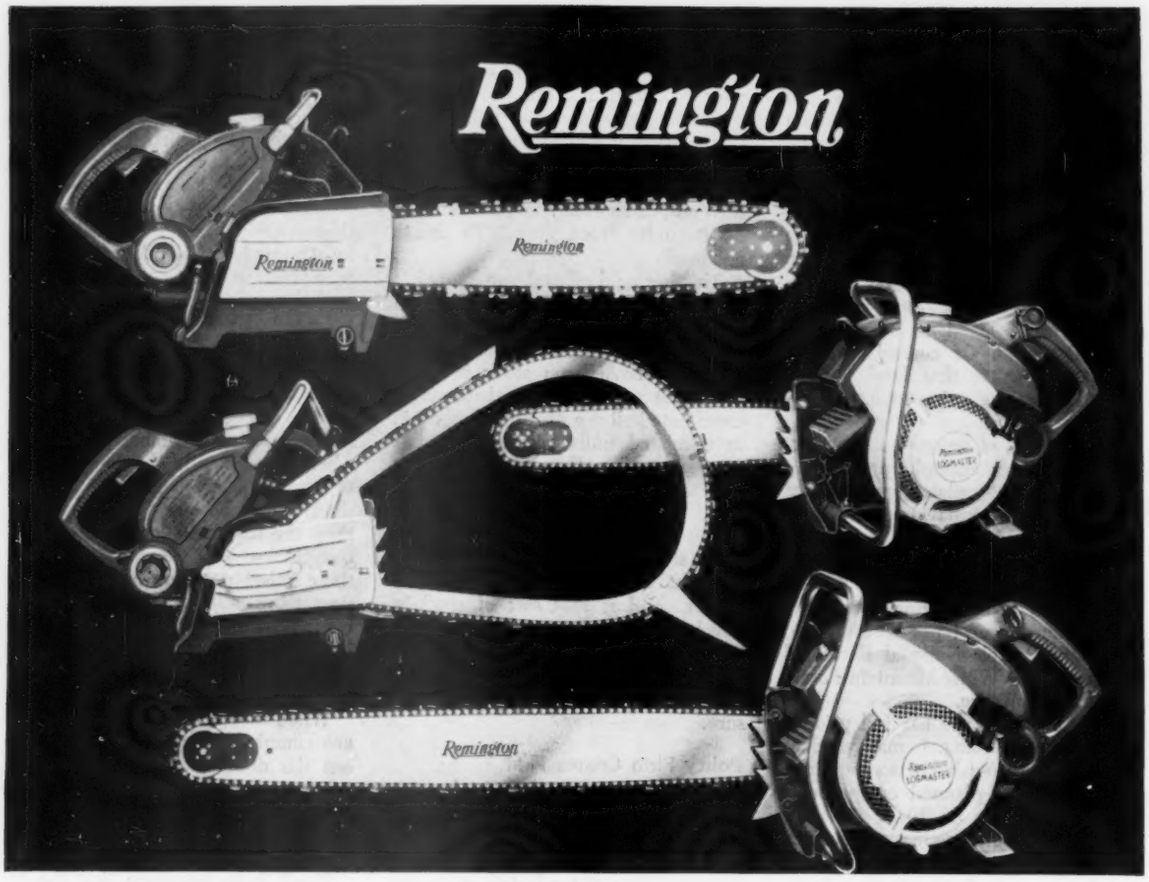
The master plan deals with the long-range, over-all use and management of watershed, wildlife and recreation in coordination with the primary objective of timber production. Always, consistently, the dominant use of the planning unit (usually a watershed) must be wood growing. But then the land-use planner, closely in cooperation with the forester, fits in these other uses so that year after year there will be the least danger, disruption, nuisance effect in other-than-wood values and uses and the greatest inclusive value harvested by the owner.

When these two utterly basic steps are completed you're ready to work out the detailed plan of where the fireplaces, garbage pits, toilets, pitcher pumps, parking spaces of campground, the lot lay-out of the summer home group will go.

You'll have assurance that the facilities will interfere least with other forest activities, will be installed according to your planning instead of yielding to pressures, and each campground will have the best "built in" protection against fire or sanitary threats to public health. Not until this point in planning is reached should any but the most stop-gap sort of installation, the most temporary, be allowed in the wood growing forest.

There is a great deal more to be discussed. Certainly the best use of your forest, the best protection against clashing uses, lies in systematic all-resource, all-use, comprehensive-to-detail planning—the same type of systematic planning you do in your wood production program. If I have stimulated your thinking about this "compatible" planning, based on the dominant use approach, integrated to the fullest with your forester's timber management plan, I've probably performed a service.

From this point on you are going to encounter tremendously accelerating demands that other-than-wood assets on your forest be put in service. You better face up to it and have ready your own policy and program for meeting these demands.



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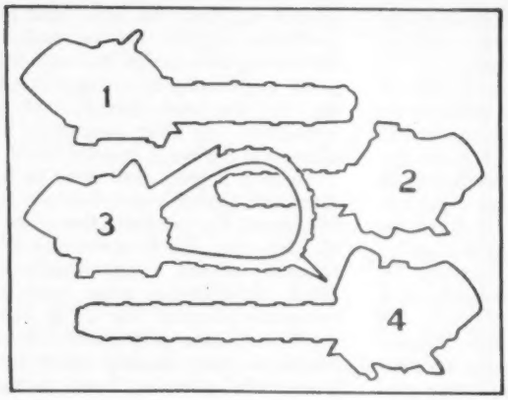

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DU PONT

Panel:
New Developments
Which Promise
Lower Pulpwood
Production Costs

COST PROBLEMS were pondered by (from left) Seaman K. Hudson, Container Corp. of America, chairman; George W. Abel, Owens-Illinois Glass Co.; Ray V. Malecki, Union Bag-Camp Paper Co., and Frank W. Cowan, St. Regis.

Tree Planting is Money Well Spent

But newer and better tree planters are needed to make fuller use of this important tool for intensive land management

By R. V. MALECKI
Union Bag-Camp Paper Corp.
Savannah, Ga.

● Let's go back in time some 12 years to an American Pulpwood Association meeting. The topic of discussion has to do with new developments in planting trees. There are only two new ones: First, a mechanical furrow type tree planting machine has been perfected; and second, there has been talk of doing something to the ground and the cover on the planting areas. We are thinking of how this new planter will help us get our old fields and barren woods areas into rows and rows of pine trees. Doing something to the ground and the cover registers with us as a good idea if it doesn't cost too much. None of us even thinks of these developments as being related to a lower production cost. Only when we think of our increasing cost of labor do we see a faint light of cost cutting.

About this time, on our home fronts, forestry and land management were emerging from their cocoon of "caretaking and fire fighting." Many of us were still acquiring more land. All of us began taking more and more critical looks at our existing ownerships. Among other things, increasing prices of forest land sharply focused the attention of our top executives upon our management efforts of this valuable resource. Many of them asked questions about growth and production. We did do a lot of closer, critical looking. When asked why we were not growing more, our stock answer was that the stocking or number of pine trees was not enough in many areas.

One could hear arguments pro and con regarding rotations, inventories, stand descriptions, and evenaged versus all aged. Timberland continued to rise in price and new mills began to join in what sometimes became a mad scramble for more land. Our thinking began to be more and more centered around growing more wood as cheaply as possible on everybody's land. We found out that there were more acres than we thought that either needed more growing pine trees or a harvest cut and then more pine trees. Pulpwood was becoming a primary crop rather than a secondary or tertiary one. Delays in harvest areas of 3 to 5 years of waiting for natural seeding became economically inexcusable with 30 and 35 year rotations. Restocking of pine trees began to be a paramount objective of all thinking landowners. In other words, tree planting was becoming a major technique in managing woodlands.

Today's Picture

Let's come back to 1959 and see what has happened to tree planting since the perfection of the furrow type tree planting machine. Practically all of the developments have been concerned with the seedling or the site where it is planted. We have seed producing areas, company tree nurseries, grading of seedlings, and have started seed orchards. To the site itself we are applying cultural measures termed "site preparation." We even have gone a long way towards exact site identification and prescription planting. All of these things have involved the expenditure of a lot of money. The South is in intensive forestry with a vengeance—and a purpose. We want a certain kind of tree in a certain place. This insures lower eventual delivered costs of wood and will perhaps stabilize our procurement problems. At one of the S.E.T.C. meetings one of our older hands in pulpwood forestry was asked his ideas about site preparing and planting. His only comment was brief and to the point—"this is money well spent."

We are also enjoying increased public and community relations bene-

fits. Our neighbors and friends see that we really mean business—and they get on the bandwagon of better forestry too.

I learned the other day that the total tree nursery production in the South this year was over one billion seven hundred million trees—enough to plant almost two and one half million acres of land. In addition to becoming a primary technique of growing trees on large ownerships, tree planting is now a means of reducing crop acreage in the South. It's pretty big business, and means a lot of dollars. Like big business, however, there are areas where the job can be made more efficient and less expensive.

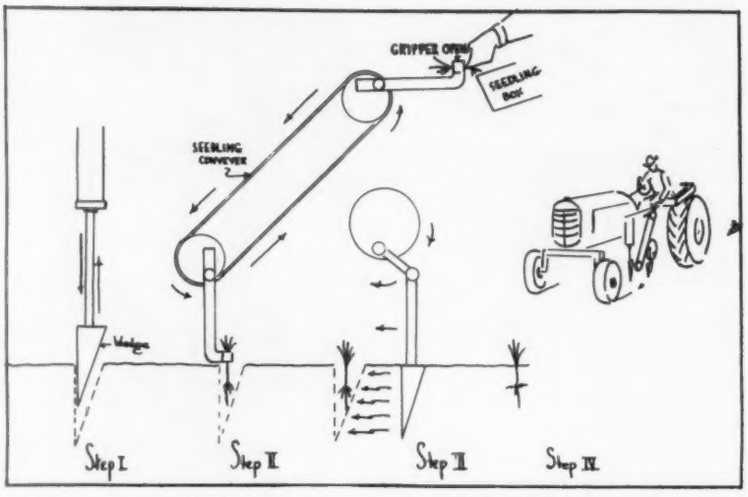
Keeping Wood Costs Down

In the area of operations of the Southeast Technical Committee, 13 of the 19 member mills replied to a tree planting questionnaire sent out by Bob Richardson of Riegel Paper Corp. These mills are planting some 163,000 acres during the current season at an approximate cost of one and one quarter million dollars. Each mill was asked to state what should be done to keep these planting costs and eventual wood costs down. Four main things were listed as follows:

1. Continued improvement of seedling survival by quality control of the seedlings—to get a plant that is well formed, rooted and free of disease.
2. Urging or conducting and using more research into conditions that insure better growth and yield of the planted trees.
3. Using direct seeding in certain areas under proper conditions and conducting further research on fuller application.
4. Improving existing design of present mechanical planters or getting a new type on the market.

The new developments numbered 1, 2, and 3—quality control of seedling survival, growth research, and direct seeding—are accepted as needed and are being given increased emphasis. We of the Southeast, however, feel that point number 4—a new kind of tree planter—is something that all of us should consider. In fact our committee went on record as recommending this need to the attention of equipment manufacturers. The basic design of the planter has remained a shoe plowing a continuous furrow into which the tree is planted—all followed by packing wheels.

Again referring to the questionnaire, we were asked to list the major problems of planting on company lands.



PLANTING BAR USES 4 STEPS. In step I, wedge drives hole and retracts. Step II, tree is placed in gripper and carried to hole. Step III, second wedge moves dirt to seedling. Step IV, gripper releases planted seedling.

Major Planting Problems

1. The high cost of hand planting.
2. High cost of mechanical planting on areas already cleared and harrowed.
3. Too many planter breakdowns.
4. Variations in the planting depth of seedlings.
5. The inability of present machines to plant eroded and hilly areas.
6. Planting normally wet sites.

We feel that a new planter or drastic modification of the present one must solve each of the above problems. Some attention and thinking have been given. A man in Alabama several years ago decided to machine plant an area of relatively high stumps. So he just built a planter based on the principle of a large wheel punching a hole in the ground and another offset wheel packing the tree. The machine was home made and dismantled after it successfully planted the area in question.

J. A. Holekamp of APA came out with a mechanical planting bar idea. I showed this to one of our bright young foresters and he said "Rube Goldberg—but it might work." I'm sure you can think of limitations of both of these planters—but you may also have a better idea.

There has also been progress in a machine to direct seed just as you plant corn. Our chairman here was instrumental in perfecting a furrow seeder. Essentially this machine partially site prepares and plants in one operation. Where the variables of weather and proper seed preparations permit, this machine has application in areas where complete site preparation is not desired.

These three examples indicate slow development in a new kind of planter.

We would like those in the industry who are concerned with a lot of planting to think and see if a newer kind of machine is needed. Perhaps a show of additional interest would encourage manufacturers to do some developing. There are some 20 million woods acres in the South alone that need planting. Just a small saving in costs of planting is a lot of dollars.

Tree planting has become an important tool of intensive management. Continuing improvements are being made to the seedling and the area to be planted. We feel that these improvements should also be applied to the actual technique of getting the tree into the ground. Here is an area where we can get some of our costs in line.

We would be pleased to receive any ideas or suggestions regarding planting machines. We owe it to our industry, our employers and our neighbors to become mechanical-engineering minded for a few minutes and see if we can save some of these dollars being spent to getting every acre properly stocked.

Utilization Is Key to Lower Costs

New product possibilities must be developed, from pulpwood components now discarded or not used to fullest profit advantage

By GEORGE W. ABEL
Owens-Illinois Glass Co.
Toledo, Ohio

● Perhaps the first step is to attempt to define what we are talking about. First of all, I find it necessary to restrict the range of reference to the Southern yellow pine region. Second, on one end of this titular pulpwood see-saw, we have the term "utilization' and on the other, "pulpwood production costs."

From the several possible shades of meaning commonly associated with the word "utilization." I select the definition that utlization is "to turn to profitable account or use." A further qualification should also be made to the effect that the "profitable account" should have a higher forecast return than other investment alternatives competing for the same capital.

It is important to keep this definition in mind, for like so many supposedly obvious matters these considerations are often lost sight of, and all too often trip up even the best of our technical planning and engineering. Those who are tempted to doubt this have only to attempt to sell their corporate management on an improved pulpwood production project, for example, without an adequate investment analysis backed up with the usual break-even and minimum cost point charts, and in larger undertakings, a proforma balance sheet.

Part of the point I am trying to bring out here is that one can't very well talk about engineering the utilization of pulpwood without also talking about the utilization of money and realizing that there are all sorts of investment alternatives contending for the use of that same money. This functional definition of utilization has advantages in that it helps to direct our creative efforts into those channels which currently offer the best chances of operational and financial success. Such an approach to utilization research, development and engineering is essential in the pulp and paper industry simply because pulpwood offers such a tremendously varied storehouse of product possibilities, most of which still remain locked behind both physical and economic barriers.

"Costs" Have Different Meanings

As they are related to utilization, "pulpwood production costs" mean many things to many people. Within the same mill, they may well mean one thing to the woodlands manager and quite another thing to accounting.

In varying degree, pulpwood production costs generally reflect a composite of pulpwood grown on company timberlands; wood and stumpage purchased on the open market; logged by both contractors and company operations; and transported by truck, rail, or barge.

The components of pulpwood production costs are obviously extremely varied and constantly shifting to the point where they are often difficult to keep in a completely balanced focus. Part of this shifting represents the gradually materializing elements of cost improvement in all phases of pulpwood production. Other changes and obviously more potent ones are constantly pressuring both actual and adjusted pulpwood costs upward.

Much of our pulpwood production progress represents a mixed blessing in that it contains elements of both increasing costs and profits. Those who have labored for any length of time amid the inherent paradoxes of forestry and pulpwood production know this full well. Over the past two decades or so, we have witnessed a situation where, in spite of apparently substantial advancements in forest management, logging engineering, and utilization, our outlay for wood has been making up more and more of the total cost of producing pulp.

CHART I

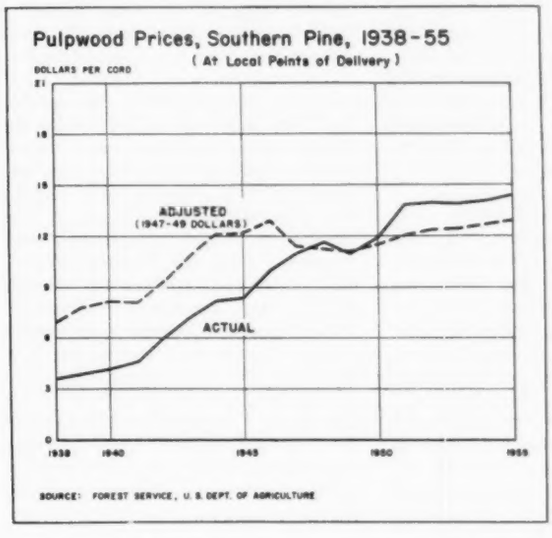
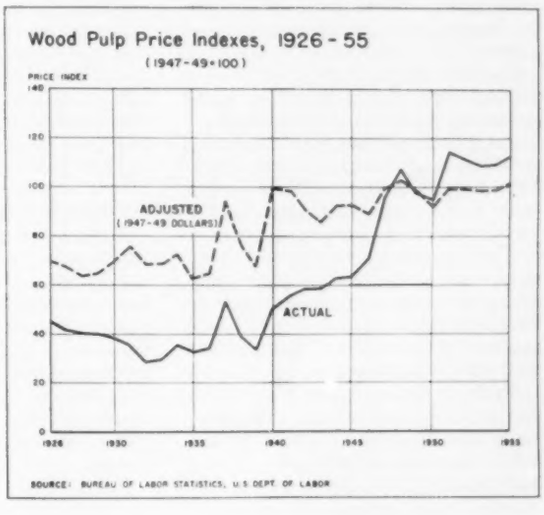


CHART II



Production Cost Trends

There is no real point in talking about pulpwood production costs unless we have some conception of what has happened to the purchasing power of the dollar. The U. S. Dept. of Commerce reports that, based upon the 1947-49 dollar as 100%, our present dollar has declined some 16% in purchasing power at the wholesale level over the past decade and about 19% on the consumer price level over the same period. In other words, all other production cost factors, remaining equal, the same amount of money simply cannot buy the same amount of pulpwood as it did ten years ago and for that reason not all of our increased pulpwood production costs are real.

A substantial part of them are, however, and this is clearly shown in **Chart I** which shows the 1938-55 trend of Southern pine pulpwood prices at local points of delivery. Both actual dollars and those adjusted to the 1947-49 base are charted. Wood costs at the mill would be somewhat higher since they would include freight, trucking, woodyard operation and administrative overheads. The corresponding price trends, as reported by the Bureau of Labor Statistics, for all domestic woodpulp is shown in **Chart II.**

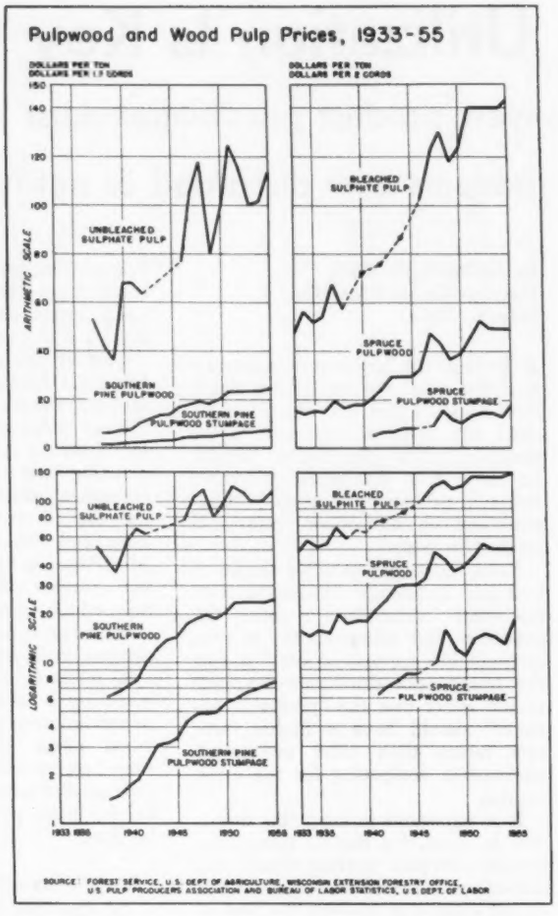
The indicated increase of 123% between 1940 and 1955 is more than the 105% rise in the wholesale price of paper, but substantially less than a 162% rise in paperboard prices, and less than half the reported 264% rise in the mill price of lumber over the same period, or the 243% rise in pulpwood prices.

Chart III, the last of this series shows in the left pair, the relation between prices of Southern pine pulpwood stumpage, Southern pine pulpwood at local loading points and unbleached sulfate pulp. The prices of woodpulp per ton together with the prices of a quantity of pulpwood and pulpwood stumpage required to produce one ton of pulp are shown on an arithmetic scale on the top chart. A logarithmic scale has been employed on the bottom chart to show comparative rates of change and on such a scale equal vertical distances denote equal percentage changes.

The 1940-55 increase of 97% in the price of unbleached sulfate pulp compares with a 243% increase in Southern pine pulpwood prices and an increase of 350% in the price of pulpwood stumpage.

Perhaps the most significant point to be brought out from this chart, especially the lower diagram, is that while increases in pulpwood logging and transportation costs have been substantial, the increase in stumpage

CHART III



prices has been the major contributor to the rise in our total pulpwood production costs. Further, as the chart shows, this has been especially true during the last decade when total production costs have shown some tendency at leveling off, while the rise in our stumpage cost continues unabated. From all the data available, the trend is unmistakable that stumpage costs are laying increasing claim to an ever higher percentage of our total pulpwood production costs and there doesn't seem to be a great deal that we can do about it in the immediate future, at least.

Relative Importance of Costs

Before one can think or even talk about any effective control of our total pulpwood production costs in relation to the profit patterns of our industry, it is essential to have a clear understanding of the relative importance of the several major cost components, their composition, their trends in relation to each other and their comparative susceptibility to control and lowering.

First of all, it is apparent that stumpage cost increments have been a dominant factor in our overall pulpwood production cost increase and may become more important in the future. The composition of stumpage costs varies considerably with Southern kraft mills and promises to change substantially with the passage of time. As a general average, these mills now obtain some 75% of their pulpwood from outside sources and 25% from company owned or controlled timberlands.

As our forest management planning and investments gradually mature, the proportion of company-grown wood should substantially increase, and along with it a more stable overall wood supply situation susceptible to more mechanized operational treatment and whatever lowering of production costs may be associated with this change. To a somewhat lesser degree, of course, the same improvement in operating conditions can be forecast for the better managed open market stumpage.

Also, an increased utilization of Southern hardwoods many assist somewhat in the effective control of overall stumpage costs. While this day is not as far away as some believe,

neither is it exactly knocking on our front door, so to speak. Time may be collapsing for some people, but something is certainly keeping it propped up out in the woods.

In summary, our immediate stumpage cost picture appears to be dominated by highly competitive open market conditions while in the near background we can see a partially ordered and stabilized wood supply emerging from successfully planned and executed timberland management.

Forest Management Expenses

As another pulpwood production cost component, forest managment expenses associated with site preparation, planting, TSI, protection, genetics, ad valorem and income taxation, etc. are pressuring the costs of both company-grown and outside stumpage. Within their broad scope, these management activities, together with their associated operating and investment costs, are necessary for the production of our timber supply in terms of location and improved operability as well as volume. In their total effect, they offer every possible combination and degree of deferred return to the industry and will eventually generate benefit/cost ratios favorable to our pulpwood production economy.

Logging or Harvesting

A third and vitally important cost center in pulpwood production is that of logging or harvesting, including transportation to the mill. I suppose, when all is said and done, more fuss has been made over this cost sector than any of the others and perhaps all the rest of them combined. At the same time, any serious attempt to investigate and appraise the components of this imbroglio we call harvesting costs can be most frustrating.

About all that can be safely said of them is that in their total effect they are extremely varied from one operation to another, reflecting every possible degree of management, good and bad. Also, that as a composite cost they will stubbornly and probably successfully resist our best efforts at any substantial reduction until we can develop logging chances that will support major operational improvements. Many of the chief factors presently affecting harvesting costs are quite beyond our immediate control and some, like legislation, apparently beyond any control whatsoever.

The great bulk of our cost control efforts in this sector have been directed towards reducing the ever-mounting costs of labor and our dependency upon its increasing scarcity. Mechanization is the term usually applied, but the entire field is one of logging engineering and in its most effective form can hardly be fully developed until we have a stabilized, high-yield pulpwood production environment that will support heavy mechanization investments.

We can and must make effective progress in this area of cost control. If we assumed that no improvements can be made, we would be making a self-fulfilling prophecy, but the matter of timing in relation to the economics of production can spell the difference between success and failure in any mechanization development.

In hasty review of the major pulpwood production cost centers mentioned thus far, I feel it can amply be demonstrated that the improvements we have made in some sectors have been more than lost in others. It can be further demonstrated that our major cost increments have occurred in areas where we have not been able to exercise an appreciably effective level of control and that we have been fighting an uphill battle against superior economic forces. Going back to the simile of a see-saw mentioned earlier, and placing pulpwood production cost on one end and production profits on the other, I think it is obvious that the positioning of the utilization fulcrum is all important. Even small changes in its positioning in our favor can give us more leverage for the reduction of relative pulpwood production costs than possibly any combination of growing, harvesting and transportation economies we are likely to effect in the immediate future.

Increase of Fiber Percentage

In the recent past, something between 40-50% of moisture-free wood weight was utilized as commercial fiber, both bleached and unbleached. In the last 5-6 years, however, our manufacturing technology has increased this fiber yield at least another 10%, on the average. Some few mills are approaching 60% fiber yields for use in strong, unbleached pulp. Pulp and paper technologists tell us that the presently forecast maximum fiber yield lies in the 62-65% range for Southern pine kraft pulp.

In addition to fiber yield the sulfate industry has been recovering some heat value from organic materials removed from wood by digestion. This heat is, of course, used in the generation of steam and recovery of chemicals. Fatty and resin acids are being recovered in the form of tall oil and the recovery of turpentine has been found to be profitable. The yield recovery of these by-products should be increased as a result of research and development of improved techniques.

Pattern of Utilization

Utilization conditions vary considerably in the Southern kraft sulfate industry but the average position at the present time can be approximated as follows: using the so-called cord as a somewhat dubious standard of reference on one end and the hardly less equivocal dollar on the other, we find that the industry is capable of deriving a total product value of about $80 for every cord consumed in manufacture. Of this some $75 can be credited to pulp value; $1 to heat value of the bark; $2 to liquor recovery heat value; and $2 to the by-products of turpentine and tall oil. Thus a cord of wood costing say $25 has been manufactured into $77 worth of salable products and $3 worth of manufacturing energy.

With this existing pattern of utilization, our pulpwood cost amounts to about 31% of product value and is increasing. Assuming that fiber yields can be increased another 10% and that tall oil and turpentine by-product production can be doubled, we have on the same price basis an increase in value of about $11 per cord to a total of only about $91. This is about a 14% increase from our present position to a forecast yield limit on our present product pattern.

I certainly am not in a position to forecast future price structures in our industry, but it quite probable that our total pulpwood production costs will continue to rise and completely overwhelm this potential yield margin. As important as they are, improvements in our present product pattern apparently do not offer enough promise of holding or reducing our pulpwood cost-product value ratio.

Need New Product Possibilities

What is needed are new product possibilities researched, developed, engineered and sold from pulpwood components we are now either throwing away or utilizing to substantially lower profit returns than they might be. To the extent that industry can be successful in this sector of new product development and sales, our relative pulpwood cost position can be held within reasonable limits or even, perhaps, improved.

With a presently effective product ratio of only 50-60% of our pulpwood material the challenge is certainly there. In my opinion, more complete and profitable utilization offers our industry more opportunities for absorbing rising pulpwood production costs thany any other area. Cost improvement in other sectors such as forest management, logging and transport are important, but I do not feel they offer the opportunities for effec-

tive control of pulpwood cost ratios comparable to the utilization frontier.

From what I have said, it could be easily inferred that all the responsibilities and opportunities for improving our pulpwood cost ratio lie with our TAPPI-type people. The answer to this is, of course, an emphatic no.

Utilization begins in the woods and extends through every pulpwood production operation to the mill yard. Just a few years ago it began with a logging operation where we had only to determine what stumpage we could afford to log and what we could not. Such considerations will always be one of the dominant problem areas of utilization—How much of the material we are buying and growing can we afford to log and manufacture? The pressure of rising pulpwood production costs will force us to modify our presently simple frames of utilization reference into increasingly complex situations requiring constant reorientation to new break-even points in all phases of management and harvesting.

It is significant to me that about a year ago TAPPI activated a new Forest Biology Section to work hand-in-glove with its other technical sections in improving pulpwood from the genes on up. Our forests are being examined and re-examined for controllable growth and wood characteristics that we can profitably utilize. In the South, various technical groups have focused considerable attention on the opportunities of controlling yield and quality losses in pulpwood storage areas.

There is no effective pulpwood production cost control associated with a disjointed program where we lose much, if not all, of our improved pulpwood yield and quality to assorted fungi and beetles even before it gets to the chippers. Some of our Southern mills have gone to considerable expense in the construction of pulpwood storage facilities to prevent such wood losses. Lower wood inventories with really fresh wood are also part answer for many of us, but we must develop a more stable and regulated wood procurement economy.

Forest Biology, teamed with high-yield silviculture and all elements of pulpwood production engineered in simultaneous physical and economic balance are essential partners to more profitable and complete utilization. As I understand our pulpwood production opportunities, utilization is the major limiting factor in the broad picture because as a free private industry we can afford to invest in pulpwood production from the seed on up, only to the extent that utilization returns and sales profits will justify it.

In closing, I would like to emphasize the importance of the matter of timing and maintaining a realistic physical and economic balance between pulpwood production and utilization. All too often we tend to think of them as separate processes. In our business, utilization should begin with a genetically qualified seed and end up in an array of products in a multi-product industry.

Mill Woodyard Costs Can Be Cut

New techniques such as weight scaling, outside chip storage, and log handling machines will help increase efficiency

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● In recent years there have been vast changes and many improvements in wood handling both in the woods and at the mills. Accomplishment has not been universal, but there is certainly widespread interest. The effect of efficiency of the woodyard system of a mill extends far back and far ahead of the woodyard itself; even back 300 miles or more as in my case.

Woodyard of the Future

The ultimate in pulp mill woodyards might consist of a neat, fence-enclosed, black-topped yard of perhaps three or four acres, located up wind from the mill. Trailer trucks hauling chips entering the gate would drive slowly over a series of warm water jets to wash the bottom of the trailer, while the attendant also passed each driver a keyed card, of a color which would identify the species of wood delivered.

The paved drive from the washer would divide into two or more lanes each leading to a roofed-over unloading hopper. The treadway above the hopper would actually be the platform of the weighing scales. The truck driver would drive up the lane marked the color of his card, would dismount from his cab, insert the keyed card into a slot and the gross load would be imprinted on the card, as well as onto a master card within the scales.

A moment later a hydraulic piston arm would automatically move out and trip the hinged bottom plates of the trailer, dumping the entire load into the hopper below. After perhaps a minute, when the tripping arm is again fully retracted, other arms would swing up from below to close the bottom plates. When the bottom plates are again latched and the closing arms are retracted, the scales automatically record the empty weight of the trailer. A bell then rings, the driver removes his card from the scales and drives on ahead and out the exit gate.

Railroad hopper cars especially designed for carrying chips would be handled in much the same manner, and would be weighed and emptied, one after another without uncoupling, as they are drawn through the unloading shed as a complete train of cars.

Obviously, all chip trailers and all railroad cars would be of a uniform design, and strictly single purpose units.

Chip deliveries would be carefully scheduled in accordance with digester requirements. The railroad hopper cars would be emptied during lags in truck deliveries. Relatively little chip storage capacity would be required at the mill, and this would be largely to handle the surge of chips due to pulp mill interruptions or where the flow of a particular species of wood chips cannot be kept on schedule with its use.

Unfortunately, there are a few flies in the ointment, and it is going to take a little time and organization to

make this system work. For example, the running gear on conventional existing trailers and railroad cars seems to limit effective bottom dumping, although Atlantic Coast Line has recently announced a new class of chip hopper cars 15 ft high, 50 ft. long with capacity of 28-30 units of chips. The most serious problem would be the scheduling of chips. This would probably end up by merely transferring most of the old woodyard grief to some other place.

Leaving our "ultimate woodyard" for now, let's review the problems as we face them today, and see what solutions have been turned up by various mills.

In considering improvements for a woodyard for a mill in the Northeast, we must, of course, first realize that probably nowhere else in the entire world is there a region with as much diversity of climate, timber types, ground conditions, transportation methods, customary pulpwood lengths, and both age and variety of pulp mills.

WEIGHT SCALING IS A GREAT STEP in woodyard improvement. It is quick, accurate, without personal prejudice and self-adjusting for wood irregularities. It is a big trend in the Northeast.

Essential Functions

A pulp mill woodyard has several essential functions. It is the point of receiving the basic raw material in wood pulp manufacturing. It is also the place where the wood is measured, unloaded (or hauled from the river), stored, debarked in most instances, and handled on to the chippers or grinders. It is also the cushion or shock absorber between wood delivery and use. It consists of drives or railroad sidings; wood handling equipment; debarking equipment; and space for storage.

The woodyard should be a clearcut unit of the plant and its area should not be trespassed upon for use as a spare coal pile or a junk yard. The efficiency that should be expected of a woodyard is difficult enough to obtain without the clutter and dirt that is so often the fault of some other department. Coal, chemicals, spare parts and old iron not only hinder wood handling and storage, but also can be the cause of wood deterioration, dirt in the pulp, and damaged chippers and screens.

Because of the diverse requirements of mills, each woodyard will always have its own assortment of problems. However, there have been developed in recent years a number of improved techniques, machines, and ideas which are working out well and may prove to be usable at other locations.

Actually, woodyard problems begin when the tree is cut down in the woods. Within a few moments the degree and direction of mechanization is established as it is cut into lengths for its first handling. Theoretically, some of our problems can be controlled here. Length, size, species, quantity and quality are the principal features. At most mills, thought should periodically be given as to whether the customary established length of pulpwood is the most efficient in the light of new hauling equipment. Frequently a change in wood length could be made without complete revamping of either woodyard, and chipping or grinding equipment.

Four-foot Stick "Extinct"

The 4 ft. stick of wood was a by-product of river driving, horse hauling and man-handling, and worked fine when good men could be hired for a dollar or two a day. Like the dinosaur, this amphibious monster should be permitted to become extinct. It does not adapt well to mechanical handling either in the woods or at the mill. A machine which will pick up a half cord of 4-ft. wood can usually handle close to ¾ cord of 5-ft. wood or even one cord of 8-ft. wood. Or worked the other way, a smaller machine is able to handle a cord of the longer lengths. Much of the structural weight of a grapple, for instance, is made necessary by the lengths of its arms.

As with the river drive, however, we must remember the limits of the transporting carriers, legal vehicle width limits, etc. and present and future logging systems. The 5-ft. stick is all right for one tier on a short truck haul, while the 4- or 8-ft. lengths are better for longer truck hauls. Four and 5-ft. wood handles well on the new all-steel "V" bottom rack cars. With the re-usable steel mesh tie-downs available for rack cars even peeled wood can be safely transported over double track lines. I understand that 8 ft. (100 in.) wood rides well on rack-flat cars. Use of the same sort of re-usable steel mesh tie-down can make this safe on all lines.

Inasmuch as loading, scaling, and unloading any common length of pulpwood is quicker as well as cheaper on rack-flat cars than on most any other sort of car, we should get away from accepting box and gondola car shipments as soon as possible.

Watching Handling Costs

A cord of pulpwood represents the least investment of inventory when on the stump. Each step toward the mill adds costs of handling and transportation. The nearer the stump the wood can be kept and yet be positively accessible to the mill, the greater the savings on inventory costs.

In most parts of the Northeast for certain and probably in many other regions, climatic conditions limit the periods when wood can be delivered constantly from stump to mill. Intermediate storage areas adjacent to all-weather highways or to railroads can often be used to cushion the jolts between, say, the peak frozen road hauling and the spring breakup period. There is nothing very new to this idea. It is just that new mobile equipment can make it again feasible to those who abandoned it years ago. The concentration yard is equally useful for purchased or company operated wood.

Handling costs at a properly designed concentration yard should not

exceed that of most present mill yards and may be less than many. The major savings, then, are:

(1) Interest charges on final transportation costs.

(2) Saving of valuable yard space at the mill.

(3) Standardization of carrier to the mill.

(4) Possible savings on freight charges by bark removal before final transportation to mill.

(5) Possible chipping before final transportation to the mill.

(6) Possible extension of wood purchase area.

The facilities necessary for an efficient round-wood concentration yard vary considerably and will not be discussed here. Twenty thousand cords per year would probably be the minimum quantity which would justify a fully mechanized yard, due to overhead and equipment costs, unless savings at the logging end could carry part of the load. Several yards could be served by some of the same equipment if necessary.

Weight Scaling

One of the greatest steps in woodyard improvement in recent years has been the adoption of weight scaling at many mills. The advantages to mills desiring fresh cut, high density hardwood are well known. Weight scaling is quick, accurate, shows no personal prejudice, and is self adjusting for irregularities of wood length, hollow wood, loose piling, and knot length.

For Northern mills using mixed spruce and fir, weighing has not yet been generally accepted, due to the greater variations in moisture content of desirable wood. It would appear, however, that weight scaling of all rough wood is desirable and will soon be feasible. After all, solid contents of a "cord" of wood may vary from 80 to 110 cu. ft. This could itself account for 1,000 lbs. in spruce, while the extremes due solely to moisture content would not be any greater, except in the case of peeled wood.

There are several sorts of platform scales used, but those which imprint the weights on a card in addition to indicating it on a two-faced dial seem most desirable. At least one company's weight cards, when printed with gross and tare weights and signed by the scaler, are in the form of a negotiable check. Bookkeeping expense is saved and wood supplier has his money quickly to invest in cutting or buying and delivering his next load.

Weight scaling equipment, when once installed, is also available for chip measurement when and if the mill starts accepting chips. Most mills already possess railroad scales, although usually they are not well located for pulpwood measurement.

For mills where weight scaling cannot yet be accepted, a simple yet very effective scaling office can be constructed which will increase speed and accuracy in scaling truck wood. It consists of necessary office space with two or more platforms of average truck platform elevation. A movable up-and-down ramp to cross from one platform to the next speeds measurement of opposite sides and across the rear tier. Roofing over the entire structure and installation of good flood lighting simplifies scaling in foul weather or at night, and reduces chance of injury to the scaler.

Increased scaling efficiency is a necessary part of an improved yard. Less scalers per shift permits longer open hours at the same cost, which can sometimes mean less wood stored. Longer hours can mean better relations with the wood suppliers in some cases.

Drives

It would appear that the day is coming when a woodyard drive will no longer be a combination of the Dismal Swamp and the Sahara Desert. More mills are black-topping the principal routes from the gate to the unloading areas, and also putting in proper drainage. This is good for everyone. The trucker expects to use tire chains in the woods to go through mud and snow. When he reaches the highway he takes them off. It is no fun for him to have to put them on for a couple of hundred yards wallow across the mill yard. Neither can the mill afford to have trucks stuck in the yard or a tractor standing by to pull trucks. Plowing is easier in the winter on a paved road. Mud all over the yard machinery or the wood is not good. Neither is dust.

Where asphalt paving sounds too expensive or where road location changes are anticipated in the near future, simply improving drainage and then treating the drives with waste sulfite liquors will help the situation considerably.

Unloading

Efficient scaling facilities and good drives leading nowhere do not make a good woodyard. Unloading round wood from trucks and railway cars quickly and easily is now accomplished in many ways.

No matter whether wood is to pass directly to drums, chippers, or storage piles via conveyors, flumes or cranes, standardization of truck platforms and racks and of railroad car types should be encouraged.

Hand unloading, while it seems inexpensive in some cases, is slow. As a result, considerable conveyor or flume length is required if daily wood receipts are large. Mechanical unloading of wood can keep the unloading area compact and efficient.

There are now so many mechanical arrangements for unloading trucks that just a listing of the variations would look like an encyclopedia. The basic systems for short round wood are:

(1) Single sling, double slings, and split sling.

(2) Clam grapples (either cable or hydraulic).

(3) Pushers mounted on tractors.

(4) Rear dumping (either entire truck or just body).

(5) Side dumping of trip-stake pallets.

None of these systems is efficient unless a certain degree of standardization of truck bodies, racks, or stakes can be attained.

For railroad deliveries of round wood, only rack cars are really suitable for most mechanical unloading situations. The side dumping cars of the Bangor and Aroostook used in Maine are limited to dumping in large volume flumes or rivers. The gondola car used in the Lake States is not much better than the box car in some respects.

Pulpwood rack cars can be unloaded by grapplies or by pushing or pulling wood over the side. Some ingenious but simple contrivances are used at some mills. The smoothest operation I have heard of, employs a rail-mounted gantry rake straddling a flume. Rail sidings parallel the flume on either side. The wood is pulled, in small well-controlled bunches from the car, into a scoop-like chutes mounted under the gantry. The wood slides smoothly into the flume with very little danger of jamming. The system makes spilling of wood almost impossible and can handle about 30 cars every 8 hours with one man. With two sidings to work on, the reversible gantry wastes no time during shifting of cars.

Flumes are the most desirable conveyor for wood unloaded in this or similar manner, because they tend to clear themselves when over-loaded, have few wearing parts and no chain to break. With the features of the above mentioned gantry, however, there is control over the amount of wood per bite plus the sliding action of the chutes so that either chain, cable and button, or belt converors would doubtless stand the impact.

With larger flumes, even greater volumes can be unloaded from open railroad cars. Sustained rates as high as 1,200 cords per 2-hour shift have been made with pusher blades on

Gradall machines, and apparently this is not utilizing their full capacity.

Conveyors

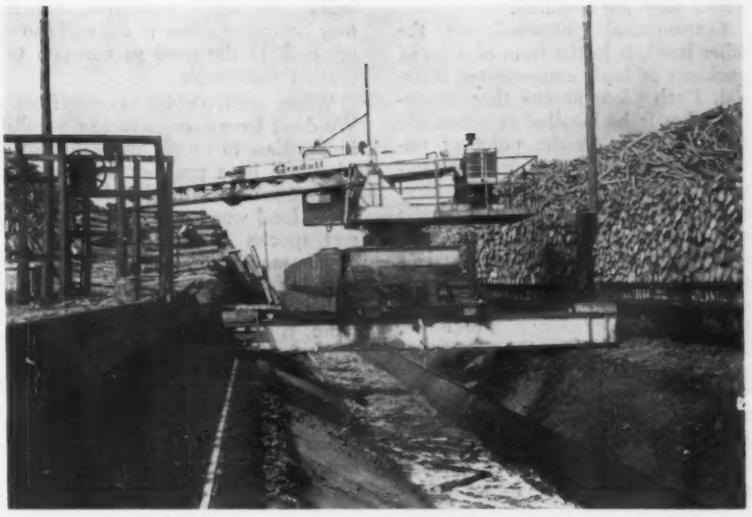
Next to the flume, which has definite limitations in very cold weather, the cable and button type of conveyor appears to be an economical sort for many purposes. It can be used in great lengths, can be used on either horizontal or inclined, and can be used simultaneously for stacking and reclaiming. It does not offer the friction of most chain type conveyors, is lighter in weight, has long life, is less subject to breakage due to jamming or impact, and has high carrying capacity. Cable conveyors are not new, but their popularity seems to be returning in the revamping of woodyards handling short wood.

Another type of conveyor which is proving very efficient in many installations is the rubber belt type. These, too, are often reversible, have high capacity and power requirements. They are very suitable for sorting wood. They are not generally good on steep inclines under snow conditions. They run on numerous rollers which require attention and installation costs are quite high. Rubber belt conveyors do have certain weight advantages, can be used on suspension bridge type of structures and show remarkable abilities to withstand shock and abrasion without excessive wear.

For dry storage and reclaiming 4- or 5-ft. wood, several new approaches have been designed in recent years. One calls for one central cable button conveyor stacker which stores rough wood on one side and debarked wood on the other. Gantry cranes on a circular track above the stack reclaim the wood with grapples and spill it into one or more hoppers where the wood is returned toward either the drum or the chippers via the same cable through a tunnel under the stack. Other versions call for all stored wood to be first debarked. This, however, either requires extra barking facilities for peak delivery periods or else very uniform delivery. In the latter case, it would appear questionable whether much storage is required.

Several mills with long stacks of jackstrawed wood use double drum winch powered rakes to pull wood back to a central below ground level conveyor. Permanent anchors are established outside the perimeter of the pile to which sheaves can be attached, for the haulback. Cranes and grapples do the actual placing of the wood into the conveyor.

Although mechanical sorting by species has not been successfully accomplished to my knowledge, it can now be done more readily by hand at some mills as a sort of a by-product of fall-out stations designed primarily to prevent jamming of wood entering the chippers. Surplus wood falls out to return to the system and the conveyor leading out carries only a single orderly line of wood. Species sorting can be more easily accomplished from this single line. Another approach has been to have different species cut different lengths, making identification simpler.



GREATER EFFICIENCY in woodyard is gained with use of Gradall crane with push bar to unload rack cars into flume at Union Bag-Camp mill.

Handling 8-ft Wood

Eight foot wood has certain features which make for more orderly storage than can be attained with 4- or 5-ft. wood. It tiers readily with either clam grapples or slings although practical heights of outside tiers cannot be much more than 25 feet without danger of spilling. Unloading from trucks and railroad cars directly onto tiered storage piles is the common practice. This eliminates the necessity of conveyors and stackers. Wood can be reclaimed with the same machinery.

Flumes appear to be the most practical type of conveyors from storage to debarker and/or chipper, even in cold climates. Daily deliveries of wood are heaviest and steadiest in the winter, so that there is no necessity for reclaiming the wood in the winter, anyway; it can be used directly off the carriers via live decks of relatively low capacity. Therefore, the 8-ft. length (more or less) looks like a preferable length for overall unloading in the East, at least for the softwoods. There are certain difficulties in handling 8-ft. hardwood, however, due largely to the greater roughness and irregularies of some wood which passes for pulpwood.

For mills with drums or chippers which cannot take the longer length, or where splitting of large diameter wood is necessary, many very reliable cutoff saw arrangements are already in use. Splitting of large 4-ft. wood is no longer a problem with several fine and rapid hydraulic, steam or air powered splitters on the market.

Generally speaking, there has not been enough provision for orderly turnover in stored wood in the past. Lack of systematic turnover has caused immeasurable loss of both wood quality and quantity. Huge, high stacks of pulpwood cannot be reclaimed from the bottom up by any method I know about. Thus there are certain advantages to long, relatively low piles.

"But," as the city boy said to the farmer,—"No matter how high you pile it or how thin you spread it, it still stinks." And that is a common opinion of many of the mill woodyards in the country. I am no expert on woodyards and I am not a mechanical engineer. But I have seen a lot of wood handling and done a bit myself. It think it about time we all looked around us to see how other materials are handled. Just look around the mill at other basic materials entering the plant in quantity.

The Pulpwood "Package"

Coal is not purchased by the bag, nor does fuel oil arrive in drums. Neither do sulfur, salt cake, clay or many other materials. They are transported by bulk in a more or less granular or liquid form. They arrive more or less as needed and are handled by dumping into conveying systems or by pumping through pipe systems and moved directly to the part of the mill

where they are required.

Conventional pulpwood, on the other hand, is in the form of a lot of packages of fairly concentrated material. Each piece at one time or another has to be handled as a separate package, even to the point of unwrapping it and disposing of the unusable wrapper—the bark. Furthermore, every pulpwood stick is a little different size and shape than the next stick. Thus it cannot be conveyed as simply as a standard box, bag, tin can, or milk bottle. For the same reasons, neat storage is not easily accomplished. It has only a few advantages over other packages: you can get it wet, which may even preserve it; you can bang it around; or mistreat it in other ways without destroying all its value.

Even then, considered as a package, a pulpwood bolt is not in an especially suitable form for handling or storing, except perhaps in water. But in one of its final forms as wood—the chip—it is in a condition quite well suited to most bulk handling techniques.

As chips, pulpwood can be carried through pipes; over belt conveyors; scooped up with buckets; pushed with bulldozers; dumped into and out of trucks or railroad cars; stacked in outdoor piles or stored in silos; and generally handled with big or small machinery with no danger of strained backs or mashed toes.

Experience at Western mills thus far seems to indicate that even prolonged outdoor storage causes at least no more deterioration than similar periods of storage of round wood; in some cases, the deterioration appears slower. Although chips do not pack down in storage or in transporting vehicles as compactly as bolt wood, it must be considered that the screened chip is in its final form, ready for use, with no bulk or weight of bark (we hope), no splinters, knots, or sawdust and other waste.

Suppose a "cord equivalent" of chips requires 180-210 cu. ft. of space. Can we judge the exact amount of usable material the mill will extract from any particular cord of rough, knotty, round wood it may take in to unload, convey, stack, reclaim, debark, chip, and screen?

The beauty of chips, other than ease of unloading under proper circumstances, is that if extensive storage is deemed necessary, conveyor costs are low, even if conveyors of considerable length are needed. Structural strength, ability to stand shock and impact, and the capacity to carry the biggest block of wood that might show up are not needed. Storing or reclaiming in different piles do not involve walking heavy cranes or shifting bulky "portable" conveyors, which may be frozen down in ice and snow or stuck in the mud so common to present woodyards.

Where are the chips to come from? We don't have enough large sawmills in the East to supply us with chips. That will be a problem for mills already troubled with irregular deliveries of local wood or deliveries of several species of wood. Under these circumstances, extra debarking and chipping facilities would be needed to handle the deliveries. This can require considerable expense for the extra facilities and power. Here it would be a matter of adding these costs to that of the chip storage and handling costs and comparing it with all normal costs of the old methods. In many instances, I am convinced that the costs would not be far apart.

Then too, we open up a new possibility for reducing the cost of our basic wood entering the mill. With weight scaling, we no longer need fixed lengths of wood in order to scale up each load. If we are going to convey the round wood to stacks for storage, fixed length is less of a problem. Why not install log-length debarkers feeding directly to horizontal chippers and save the wood producer: a few saw cuts; the short ends he would ordinarily throw away; and perhaps some extra handling. If the wood still comes in too fast or needs separate handling by species, there are several very effective machines which can unload the truck and set up neat tiers of long wood for subsequent processing. Of course, if local pulpgrade wood is too rough or irregular, long log debarking would be impractical with any debarker I have yet seen, or heard about.

Let us suppose, next, that the outlying concentration yard idea sounds good for a mill. Would not this be a good place to debark and chip some of our wood? Here, we can store wood, as necessary, nearer the stump, with less transportation costs included in the inventory. Therefore, there is less urgency to debark, chip, ship, and get the costs off the books at the same rate that the wood is coming in, although of course this is very desirable. Woods of different species can be processed in separate days or shifts or parts of shifts to suit the daily quota for the mill. The output of surplus chipping capacity can be stored on the ground for future chipping without worry of contamination from dust or fly ash as might be found around the mill itself.

For such a yard dependent upon either purchased wood, or company-operated wood, the first thought should be given to the logging methods best suited to local conditions of labor, ownership, climate, and terrain. These factors will determine the length of wood most desirable to accept, and the amount of storage required to keep the yard running at an economical rate over the longest percentage of the year.

Second consideration is that of how much wood does the mill need from that location and whether this total need is periodic during the year or whether the volume of required wood will fluctuate at foreseeable intervals.

Third consideration is reliability of transport to the mill. Is truck or rail haul preferable? Will shipments be delayed or bunched up? What are the foreseeable effects of weather on transportation to the mill? The answer to these questions determines the size of chip storage facilities at the mill, necessary to compensate for transportation variables.

For a large logging operation, I look at the concentration yard chipping plant as being a solution to many of our forestry, labor, and handling problems, as well as simplifying the mill yard itself.

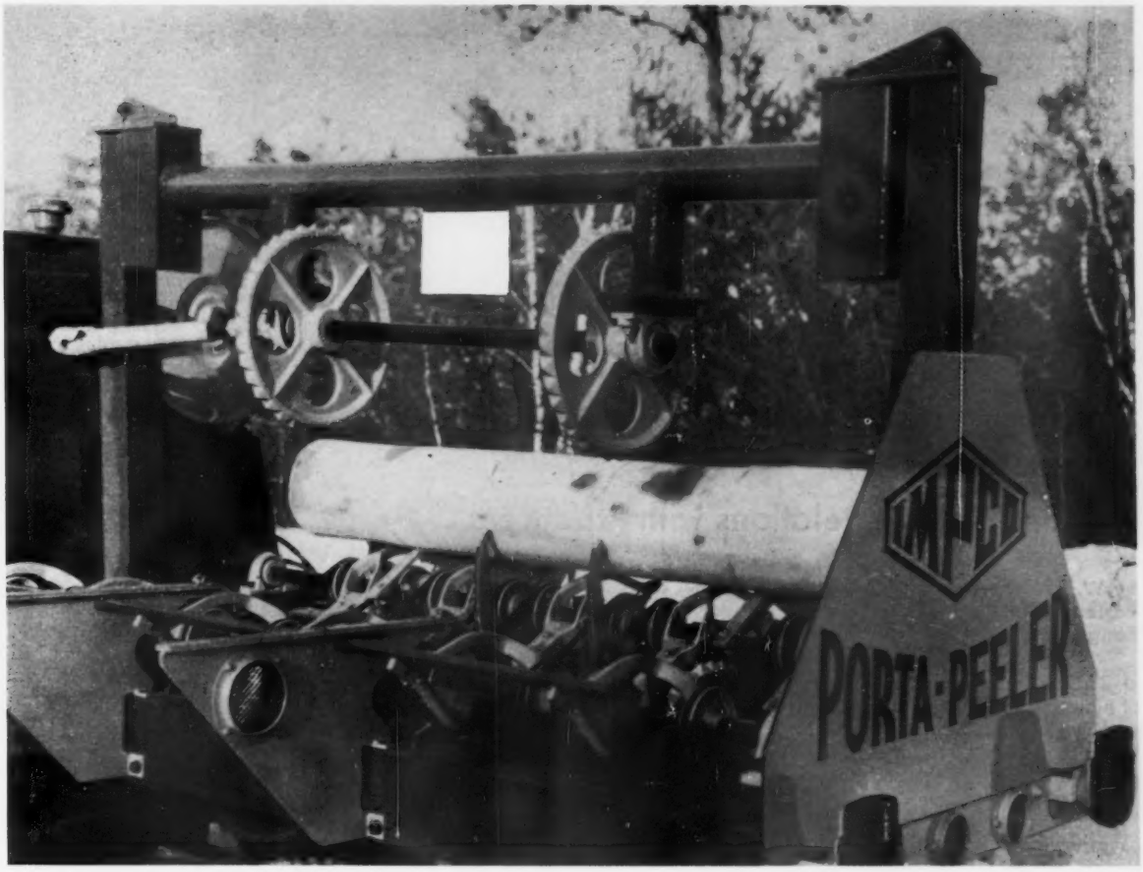
The resulting logging and handling economies, exclusive of rail or truck chip transportation costs, should result in deliveries of chips to a mill at much the same cost of round wood. Chip transportation cost would probably be higher, per ton, than for round wood.

You will note that this system does not actually require any form of machinery which does not already exist today. Variations of this method are already being used in the South and in the West, apparently with reasonable success.

In theory, then, the principle of having some of our mill woodyards simplified to receiving points for chips is possible. In many cases this would throw extra burdens on wood procurement personnel, while removing some from the mill people.

To summarize the woodyard situation, it is safe to say these things: (1) small inventories at the mill make for cheaper, more efficient, storage and handling; (2) there are fairly efficient methods and machines already in existence for handling various lengths of wood, but local customary pulpwood bolt lengths are not necessarily the most efficient size in the light of new developments in logging or wood yard handling; (3) standardization of both truck body and railroad car types are necessary if unloading is to be efficient; (4) thought should be given periodically as to whether chipping of wood can be accomplished to advantage closer to the wood sources or at another point outside the mill itself.

PORTA-PEELED PULPWOOD!



This is the Impco Porta-Peeler in action. Pulpwood contractors and users are receiving it with tremendous interest because of its efficiency and high capacity. Pulpwood suppliers can cleanly bark three to six cords per hour depending on log length. Crooked—knotty—frozen hardwoods—logs up to 26″ in diameter? No problem! Porta-Peelers can be completely mobile for wood road operation or permanently installed in wood concentration yards. Terms can be arranged to suit your convenience.

IMPCO

IMPROVED MACHINERY INC.
Nashua, New Hampshire

In Canada, Sherbrooke Machineries Limited, Sherbrooke, Quebec

Panel:
Regional
Technical
Committee
Chairmen

NEW IDEAS IN SIX PULPWOOD REGIONS are reported by (from left standing) Robert Delong, St. Regis Paper Co., Bill MacConnachie, Northwest Paper Co., Wilfred McKay, Eastern (Standard Packaging Corp); (seated from left) Kenneth Pomeroy, American Forestry Assn., Arthur L. Bennett, Armstrong Forest Co., H. H. Flickinger, International Paper Co., and E. A. Golden, Champion Paper & Fibre Co.

NORTHEASTERN:

Trucking Trends, Relations with Producers

By W. F. McKAY
Eastern Corp.
Bangor, Maine

● The past year has largely been one of adjustment for the Northeast. This pertains to mill inventories and also to our production plans for the future. In an atmosphere of this sort, you do not see outstanding innovations made in wood procurement methods. We have however, during the past year, reached a point of acceptance in three directions which very definitely will offer opportunities for saving.

Use of Hardwoods

The increased use of hardwoods by the mills is without doubt the most interesting point for the past season. Hardwoods have been used increasingly for a good many years. Now the amount demanded by our mills is a very significant factor in most production plans.

The advantages of this hardwood use are manifold; it helps in planning for integrated operations; it offers a new source of fiber closer to the mills; it increases stand per acre to the point that partial cuts are now practical. Other gains from the use of hardwood are numerous. It all sums up that the increased use of these species reached a position of real importance this season.

Consumer-Producer Relations

The second point of interest is an attempt to better the relationship between the producers and consumers; namely, the organization of an Independent Producers Sub-Committee as a part of the organization of the Northeastern Technical Committee. We used the introduction of this subcommittee as a subject for a fall meeting which we held at North Conway, N.H. It was a very well attended affair and the producers participated very enthusiastically in all phases.

The independent producer is usually a very alert type and the association with these gentlemen cannot avoid stimulating the whole group. The conclusion of the New Hampshire meeting was that the most of the consumer-producer differences could be avoided if we had better communications. Throughout the Northeast we are quite happy with the addition of the producers to our Technical Committee and hope that it will promote efficiency in our wood program.

Improved Trucking

The third point of interest is a multi-sided improvement in our pulpwood trucking picture.

There has been a trend, promoted by S. D. Warren, The West Virginia Pulp and Paper Co. and the Penobscot Purchasing Co., to the conventional pallet. Improvements and changes have been made to adapt them to our Northeastern logging. But the fact remains that pre-packaging pulpwood by using pallets is now considered a logical way to load trucks.

The H&W Division of The Scott Paper Co. has approached wood handling onto the trucks from a different angle. You might say that they are pre-loading through the use of demountable bodies or rack attachments for their trucks.

This is done by mounting hydraulically tilting sub frames to the chassis of the tandem axle trucks, upon this sub-frame the demountable wood rack is attached by the same principle used in the pallet schemes, with the difference that the entire truckload is moved onto the truck at one pull. The subframe extends over the back end of the truck frame enough to form a

PRE-LOADING TECHNIQUE used by Scott has demountable bodies or rack attachments on chassis of trucks.

ramp when tilted. The racks are also constructed with a trip mechanism on the back stakes. By locking the rack to the sub-frame the unit is dumped over the bank end, reducing unloading time to minutes. Each truck will be furnished with two or three of the racks making it possible to leave one or two units flat on the ground at the loading site. On this position they are enough to make loading from the reyarding sleds very easy.

At Scott they are also working with a much larger version to carry on a semi-trailer. While the 10-wheel units will handle 7 cords the larger rig will reach perhaps 11 or 12 cords on off-highway locations. The set-up for the semi will not have the tilting sub-frame making it necessary to unload over the side by other means. The loading seems to proceed as smoothly with the large loads as it did with the smaller 10-wheel units. Mr. Moody of the Scott Co. says that the use of this pre-loading is making possible at least 30% more production per truck on their average haul.

International Paper under Mr. Blaisdell has a very unique truck-train operation. For the past two or three years they have been employing a scheme which utilizes pre-loaded trailers. The haul is to a rail-head in Quebec from northern Maine lands. It is a strictly off-highway proposition and until the past season was considered a winter operation. The past summer the equipment was moved to Ashland, Maine, and surprised everyone at how well it worked on a crooked, hilly and poorly graveled summer woods road. This job has been the subject of an APA release and is probably well known. But I believe that during the past year this operation reached the status of a method that should be included in all planning where there are off-highway hauls.

The other trucking idea tackles the trucking of pulpwood from another side. We have mentioned pre-packaging, pre-loading of truck bodies and pre-loading of truck-trains. At the Eastern Fine Paper & Pulp Div. of Standard Packaging during the past year there has been engineered and put into operation a type of semi-trailer that makes wood transport a bulk handling job. These are side dumping bodies of 3.5 to 4 cords capacity of jackstrawed wood.

Two bodies to a trailer give a total load of 7 to 8 cords. This is not a big load cord-wise, but after careful consideration it was deemed the most efficient approach to a problem. The units are loaded by crane using a conventional wood grapple, as little as 9 min. has been enough to load about 8 cords. At the unloading point the hydraulically tilting bodies get rid of the load in 2 to 3 min.

As this is an inter-mill proposition with the return trip inland from tidewater, the trailers haul oil tanks under slung and carry about 2500 gal. of fuel back to the inland mill.

As I mentioned when I started to analyze our past season in the Northeast, no startling changes have been made in our way of life. I do think however that everyone has taken advantage of our slight recession to generally pick up on loose practices and make our wood production as tight as possible.

SIDE DUMPING TRUCK can jettison 8 cords in 3 mins., makes wood transport a bulk handling job.

APPALACHIAN:

Pallet Handling, Use of Public Wood

By A. L. BENNETT
Armstrong Forest Co.
Johnsonburg, Pa.

● Just a year ago I pointed out that it was imperative in the Appalachian Region that pulpwood procurement organizations give attention to developments to encourage more of our numerous part-time producers to become year-round pulpwood jobbers. During 1958 the very definite interest and trend toward pallet handling of pulpwood has been significantly in this direction. Every major mill wood department has carried on some work with loading wood on motor trucks using either wood or metal pallets. Several mills are now receiving a substantial volume by this method.

The simplicity and low cost of constructing these pallets are important factors in their acceptance by the producer. A 1.5 cord pallet made of rough hardwood lumber involves an investment of less than $40. The conventional pulpwood truck can be adapted for pallet hauling for $500 to $700, which includes a power take-off and winch for cable pulling the loaded pallets onto the truck platform.

Most pallet operators skid tree length timber to roadside for bucking, at which location the pulpwood bolts are loaded by hand into the pallets. More recently, however, some jobbers who prefer to stumpbuck their wood are piling it at this first handling point into pallets which are carried on sleds or wheeled carts. These sleds or carts are pulled from the woods to roadside by tractors and the loaded pallets are transferred to motor trucks for final delivery. At the millyard the wood is lifted out of the pallets by crane and cable slings. This pallet handling system greatly reduces the backbreaking work of lifting heavy pulpwood sticks, reduces wood handling time, and permits more efficient use of transportation equipment.

The Hiwassee Land Co. has designed an interesting "Booster Buggy" type cart for transporting and han-

BOOSTER BUGGY has hydraulic platform to lift load to convenient unloading height to transfer to truck.

dling either loose pulpwood bolts or pallet loads. The unique feature of the Booster Buggy, which is pulled through the woods by a small tractor, is a hydraulically activated platform which lifts the load to a convenient height (up to 7 ft.) for unloading and transfer of wood to a motor truck. A hydraulic pump mounted on the rear of the tractor provides the power that operates the cylinder which in turn elevates and lowers the X-frame in a "scissors" like fashion. More detailed information on this equipment can be obtained from Mr. Allen P. Swayne, Hiwassee Land Co., Etowah, Tenn.

An important project initiated in the past year and a half by the Appalachian Technical Committee group concerns the availability of public land pulpwood stumpage. The various state agencies and the U.S. Forest Service own large volumes of timber from which only a very small amount has been going into pulpwood. It has been estimated that upwards of 12 times as much should come from public lands in some sections of our region. A questionnaire survey indicated the following reasons were primarily responsible for disinterest in government stumpage on the part of pulpwood jobbers.

1. Lack of access and excessive road construction requirements.
2. Unfavorable timber marking practices and rules.
3. Complexity of government sales, contracts and bidding practices.
4. Lack of personnel to carry out timber marking and government sales.

At least three meetings have been held with the U.S. Forest Service people to explore the possibility of making more of their stumpage available to pulpwood consuming mills. Similar meetings with state forest holding departments are planned. We hope these meetings will be fruitful in establishing a cooperative approach towards solving some of the problems of merchandising government owned stumpage, which is often more advantageously located from a delivery cost standpoint.

HARRISON PULPWOOD HARVESTER picks up stick 14 ft. from tractor in 120° radius; in one operation production jumped almost 50% per truck.

SOUTHEASTERN:

Survey Efficiency in Woodyards

By H. H. FLICKINGER
International Paper Co.
Georgetown, S.C.

● During the past ten years, a considerable amount of equipment has been developed and tried out in Southeastern pulpwood logging, and improvements have been made in methods of operation.

The power saw is in practically universal use and, in the Southeast, a good share of pulpwood is purchased at mechanized yards.

Intensive Survey

In order to determine just how, and with what equipment, pulpwood is now being produced, an intensive survey was made on 17,910 cords of pulpwood, delivered to 23 mechanized concentration points during the week of January 19, 1959, Monday through Friday. The wood was all produced by the dealer-producer system and covered an area about 400 miles long and 150 miles deep, along the Atlantic Coast from eastern North Carolina to south of Savannah, Georgia. To produce this wood, and deliver to concentration points, the following trucks, tractors, and men were employed:

788 trucks, including about 6 semi-trailers; 266 wheel tractors; 91 crawler tractors; 11 teams of mules; 2,608 men—average 3.3 men per truck

Average per truck, per week, 22.7 cords

Average weekly production, per man, 6.87 cords

Average haul—19.8 miles
40% of the haul under 15 miles
47% between 15 and 30 miles
13% over 30 miles.

The above averages do not tell the whole story however. The maximum production, at any one location, per truck and per man was as follows, for 993 cords:

Production per truck 41.4 cords per week; production per man 10.5 cords per week.

The lowest was as follows (for 1,-563 cords):

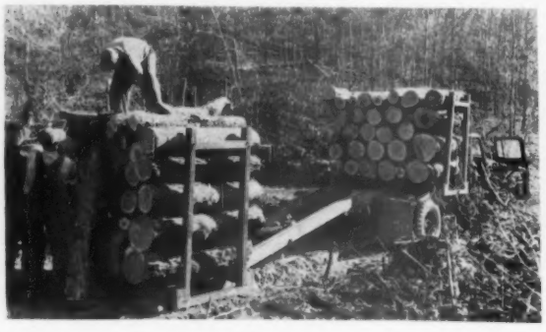
Production per truck 18.4 cords per week; production per man 5.9 cords per week.

The only significant difference in operating conditions between these two locations was in length of haul, the most efficient group having by far the longest haul, as follows:

Most Efficient Yard—Under 15 miles 14%; 15-30 miles 27%; over 30 miles 59%

Least Efficient Yard—Under 15 miles 20%; 15-30 miles 51%; over 30 miles 29%.

Obviously, the average weekly production per truck and per man is too low to provide a good income for



PACKAGED IN PALLETS, pulpwood handling is simplified. System was sparked in South, has spread to Northeast and Lake States.

either the producer or the labor. On the other hand, the production at one yard appears to provide much better returns to both producer and labor.

Both yards are using power saws, the ground conditions are not the best in either case, and the cut per acre is about the same in both cases.

Efficiency Is Mechanization

The most efficient yard, however, is almost 100% palletized and has two more tractors than trucks.

The least efficient yard has no pallets and has .57 tractors per truck.

The greater production per truck and per man is simply due to a higher degree of mechanization.

Further mechanization is still possible with presently available equipment. The most highly mechanized producer we found has, in addition to a palletized truck and tractor, one form of the "mechanical arm and back," in this case a Harrison Pulpwood Harvester. The Harvester consists of an Oliver Super 77 wheel tractor (48 hp), with the front wheels removed and coupled to a pallet cart with a swivel hitch. Pallets are 1.9 cord capacity. Steering is by hydraulic ram and the rig is highly maneuverable. The loading mechanism, mounted on the tractor, is hydraulically operated and consists of an "upper arm," "forearm" and "three fingered hand" so arranged as to permit the picking up of sticks in an area prescribed by a 120 degree arc behind the tractor, and a maximum pick-up distance of 14 ft. from the tractor. The capacity is 700 lbs.

The machine is designed to go into the woods with an empty pallet, load the pallet with bolts either as felled and bucked or bunched, haul the loaded pallet out to a road or good ground where a truck can readily pick it up. The loaded pallet is dumped by the operator releasing the hinged door of the cart, permitting the loaded pallet to slide off, and then driving away from it. The pulpwood loader is used to place empty pallets on the cart.

With the Harrison Harvester, one truck handling three pallets, a Ford tractor for bunching, a chain saw for falling, and a wheel saw for bucking at the bunching point, the producer and 5 men produced and delivered 67 cords of wood on a 45 mile haul. The timber averaged 6 cords per acre on soft ground and the pallet haul to the road was just under ½ mile during the week for which the study was made (January 19).

This weekly production of 67 cords per truck and 11.1 cords per man is three times the average truck production and nearly twice the average production per man, per week, for the period and places studied.

Other producers in the same area and with the same equipment, except for the Harvester, averaged 40 cords per truck and 10 cords per man. The additional investment required is about $9,500.

LAKE STATES:

Logging Methods, Portable Debarkers

By A. F. KOLLER
American Box Board Co.
Filer City, Mich.

● During the past year a gradual metamorphosis has begun in the pulpwood logging industry in the Lake States. The most commonly accepted method of logging pulpwood has been the so-called strip method. However, we are observing a rather definite trend towards tree length logging.

In the strip method, the cutting strips are blazed out at right angles to the main haul roads at intervals of 60 to 90 ft. The cutters are required to cut an 8-ft. skidding trail nearly the length of the strip and then cut and pile the 8-ft. wood separately by species along this trail for subsequent skidding.

The cutting and piling operations are generally carried out during the summer months and are completely independent of the skidding and hauling operation which usually commences after freeze up. Small crawler type tractors are frequently used in conjunction with drays to forward this stump-piled wood to the main haul road where it is loaded direct from the drays by jammers on to trucks. Production by this method (from tree to being loaded on the truck) averages about 1.0 to 1.5 cords per man per day.

Tree Length Logging

In contrast, the tree length type of logging involves felling, limbing and skidding to the main haul road in tree lengths. Here these long lengths are bucked up and piled along the hauling roads for subsequent mechanical loading on to trucks. Production by this method ranges from 2.0 to 3.0 cords per man per day.

It must be realized that all areas of operation do not necessarily lend themselves to tree length logging. Topography and other natural obstacles may in some instances preclude this method.

Many of the more cost-conscious operators are, however, adopting the tree length system and attribute its greater productivity to the elimination of handling from strip trails to drays, better working areas for bucking up and piling down, more allowable and efficient use of mechanical tools and equipment, and more efficient and productive in stands having low volumes per acre. Another very

STRIP LOGGING is new technique being tried out in Lake States.

TREE LENGTH LOGGING is another definite trend.

PORTABLE DEBARKERS are low in cost, make year-round debarking feasible.

definite advantage is the continuance of the felling, skidding and bucking operations during periods of breakdown in the hauling organization.

In some sections of the Lake States, the advent of portable, efficient yet low-cost mechanical debarkers is now making it feasible to give serious consideration to around-the-calendar debarking. This makes it possible to seriously consider increased volume deliveries of peeled wood on a 12-month basis. With a sap-peeling season which is of short duration and high labor costs, this type of bark removal is becoming prohibitive.

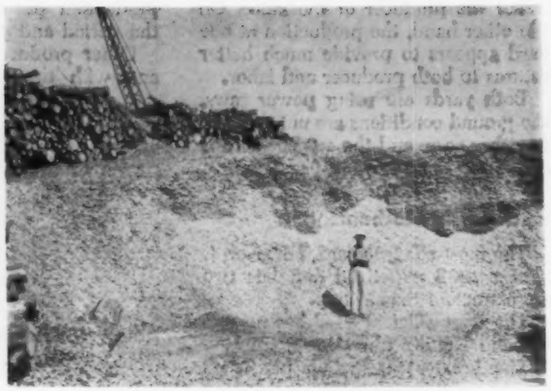
To date, complete cost, production and operational data have not been obtained for these debarkers. However, some rather large volumes have been machine peeled under specific conditions. From the data obtained thus far, it appears reasonable to assume a peeled wood production of between 1.5 to 3.0 cords per hour. Scale reduction figures presently range between 18-25%, of which 2-3% is regarded as fiber loss, the balance being attributed to closer piling after bark and knots are removed. Increased solid cubic content is also reported.

Two or three men generally operate these debarkers and it appears quite possible and feasible that some simple type of automatic trip or discharge attachment might well reduce the labor requirement by one man.

It is generally expressed that perhaps now we are on the threshold of leaving the bark in the woods where it belongs and thus conceivably can confine our transportation and attendant costs to wood fiber only. In connection with fiber loss, perhaps we should be a bit more realistic and allow that a small fiber loss in the woods is less serious than this same fiber loss or even one slightly less at the mill.

Recognizing accident prevention as an adjunct to cost control, our safety subcommittee has developed a series of safety flyers. These flyers are aimed at promoting pulpwood logging safety in general and individual attention and awareness in particular. It is difficult to assess the value of such a program; however, in all fairness one is forced to admit that even one accident prevented, no matter how minor, is worth more than the cost of many thousands of safety flyers.

Many other factors have helped to hold the pulpwood cost line in the Lake States and in addition our Technical Committee is surveying such potentials as weight scaling, mill residuals and improved transportation facilities. We intend to develop these potentials where practicable and to promote new interests which promise lower pulpwood production costs.



OUTSIDE CHIP STORAGE arouses interest in South, because of reduced wood deterioration in storage and lower handling costs.

SOUTHWESTERN:
Need to Foster Mechanization

By E. A. GOLDEN
Champion Paper and Fibre Co.
Huntsville, Texas

● It is quite difficult in this time of spiraling costs and creeping inflation to visualize any ray of light in the form of a promise of reduced pulpwood production costs in the near future.

However, this may be a good time to pause, look into the past, orient ourselves to the present, and plot a sound course of cost consciousness for the future.

Before we delve further in the picture I think that we should take cognizance of two cost aspects of supplying a processing plant with pulping material.

In the first place, a modest increase in unit costs in terms of inflated values can indicate an actual cost reduction in terms of real values. Secondly, although, pulpwood production is a major cost item, all of the elements which comprise total unit cost delivered must be maneuvered as in a giant chess game to finally come out with a cost situation which is most advantageous to continuous profitable operation now and will maintain a healthy situation for the future.

The tremendous growth of the pulp and paper industry in the South in the past two decades has developed a situation for the marginal wood producer, as each mill parries to develop a raw material supply to satisfy growing demands.

Mechanization May Be Answer

As with similar industries mechanization may eventually supply the key which will bail the industry out of this situation. However, the present climate in the wood production is still not wholly compatible to extensive mechanization.

The unstable "feast or famine" cycle of wood demand and subsequent flow offers little encouragement beyond the bare minimum capital investment required to operate in an antiquated manner. Demand for improved production equipment stays at such a low ebb that research and development can only move slowly.

The variable light cuts of small material in the broad understocked stands of the South have not furnished an attractive picture for design and development of mechanical means for pulpwood harvesting.

The immediate job is to develop insofar as possible a climate which will tend to foster mechanization.

The work toward stabilization must be continued at an accelerated pace to develop a situation attractive to the use of risk capital to promote mechanization and subsequent increased productivity per man use unit.

Landowners and land managers are beginning to realize more and more that in addition to being their outstanding silvicultural tool, pulpwood harvests are an important adjunct to the economic well-being of a properly managed forest business.

Forest operators are tending to improve the pulpwood harvest situation by offering larger pulpwood cuts per acre by heavier pulpwood markings and lengthening the interval between successive cuts in the same stand.

There is also a tendency on the part of land managers to discontinue the farmer-patch type operation on larger properties to go to a broad area type management permitting more extensive use of expensive mechanical harvesting equipment.

Outside Chip Storage

Probably the most significant breakthrough to foster stabilization in the Southern pulpwood industry is the interest taken by several companies in outside storage of chips.

The main interest stems from the potential savings which might result through reduced wood deterioration in storage, lower handling costs, and the possibility of storing a larger wood volume per square foot of ground surface area.

If outside chip storage in the South proves feasible and mills are assured a continuous supply of pulping material from stockpiled chips, both the mill operation and wood procurement operation will be less subject to the effect of temporary upsets in the wood flow occasioned by weather conditions, shortages in available stumpage, dislocation of pulpwood production labor force, and the many other factors which tend to affect wood flow. St. Marys Kraft, East Texas Pulp and Champion Paper & Fibre Co. (Texas Division) are among others who have taken definite steps in this direction.

Timber Stand Development

The past year has been an important milestone in timber stand development. Nursery facilities have been greatly expanded to take care of the constantly growing demand and tree planting facilities have kept pace, promising large acreages of well-stocked plantations for operation in the not too distant future.

Tremendous strides were made in the development of techniques of direct aerial seeding of forest lands by operators such as Scott Air in conjunction with Union Bag-Camp in the Southeast and Frank Bennett Associates with Louisiana Flyers in the Southwest.

Successful efforts on the part of such endeavors will furnish great impetus to the job of reclaiming the millions of acres of barren, non-restocking, and understocked stands in the South.

A very promising development in direct seeding late last year was the announcement of the H. C. furrow seeder which promises direct seeding in a modification of the method by which a farmer plants corn.

The corn planter principle has been tried with varying success by many people. Among these, Charlie Lewis of Crosby Chemicals in southwest Louisiana has used a corn planter to successfully restock abandoned fields and prepared sites.

Tom Croker, Southeast Forest Exp. Station, USFS, and S. K. Hudson, Container Corp., Brewton, Ala., combined a standard fire line tractor and plow with a modified corn planter and came up with a direct seeding machine which promises seeding on prepared sites, and wild unprepared planting areas.

PROMISING DEVELOPMENT in seeding is H. C. furrow seeder, which uses modified corn planter principle, has had success in South.

If this machine comes up to expectations, it promises direct seeding in rows at a desired spacing in a prepared site. The advantages anticipated are stand regeneration at low cost per unit of area, good survival, early fire protection, and seeding germination on a cultivated site. As use of this unit progresses new benefits may be found.

The above developments and many other developments in process and some yet unborn should help create the proper climate for possible cost reduction through mechanical pulpwood harvesting.

WESTERN:

Chips Are Major Source of Wood Supply

By R. L. DeLONG
St. Regis Paper Co.
Tacoma, Wash.

• Historically, the chip program is not new since a similar program was started in the West in the late twenties. The initial program failed, primarily for two reasons: (1) The amount of wood available was extremely plentiful for the small amount of pulp production; and (2) Suitable barkers and chippers had not been engineered for the lumber and plywood mills which allowed for a reasonable capital expenditure. (Chip quality was also inferior and the pulp mills received excessive amounts of dirt and bark.) A few of the pulp companies in the West, namely Crown Zellerbach and Longview Fibre, continued to work with the sawmills, veneer plants, and equipment manu-

CHIPS SPARK NEW ERA IN FIBER ECONOMY. First used in the West in the '20s, chips have become major life-line for many West Coast mills, are now being used in South and Northeast.

facturers in order to develop merchantable wood chips from mill residuals.

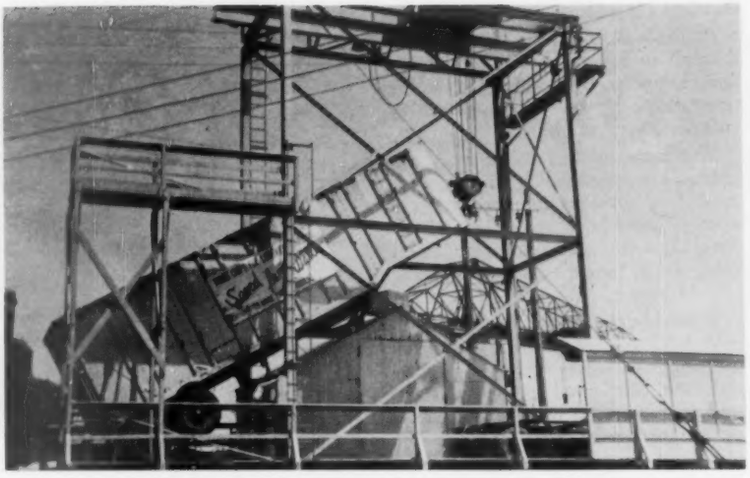
The last ten years have seen this program literally explode with all pulp and paper companies actively developing chip sources. With its start in the West, the chip program has spread throughout the United States in spectacular fashion. Since the program is developing more and more in all of the pulpwood producing regions, we feel it is timely to make the first annual report of the Western Technical Committee on wood chips.

Major Source of Wood Supply

During the past decade, the chip program in the West has progressed from a supplemental source of wood furnished to the pulp mills into one of the major sources of wood supply for the pulp and paper industry. We have seen the construction of pulp mills in the past few years built with their primary source of wood being wood chips. Even today we have not developed the potential chip supply to its maximum. The greater portion of wood chips in our operating areas will come from the smaller sawmills and veneer plants as well as from central woodlands chipping plants.

The basic economic factors of supply and demand were and still are the primary forces responsible for the chip program. Management of the pulp and paper industry is being pressed for additional tonnages and competition for the old-growth timber has been increasing since the end of World War II. Second-growth timber still has a long way to go before the potential volumes of pulpwood and other forest products are fully developed in the West.

Therefore, the pulp and paper industry in cooperation with the lumber and plywood industry, embarked on the chip program to develop the mill residuals. The pulp mills now can offer steady markets and realistic prices for wood chips. Waste burners are almost extinct in the West, and as the utilization program progresses, waste burners will become history. The machinery people have worked very closely with the chip program, developing barkers, chippers and other allied machinery and equipment necessary for the sawmills and plywood mills to produce acceptable wood chips for the pulp mills at a reasonable installation cost.



CHIP TRAILER FEEDS CHIP-HAPPY PULP MILL on West Coast. Between 2 and 3 million cords of chips are used from sawmill residues each year by West Coast mills, saving an estimated 1¼ billion bd. ft. per year of timber.

Program

The Western Technical Committee plans to continue to devote considerable time on the subject of purchased chips and are hopeful of accomplishing some of the following tasks:

1. ***Purchased Chip Measurement:*** Promote the adoption of a uniform procedure for the measurement of chips. The pulp and paper industry in the West seems to be actively considering the adoption of a bone-dry or oven-dry weight measurement. This measurement is more directly related to the amount of wood fiber required to produce one ton of salable pulp. It seems only logical for our industry to adopt a weight method in order to determine the cost of wood furnished to the pulp mills since most costs are based on weight measurement.

2. ***Purchased Chip Specifications:*** This phase is more or less on the pulp mill level; however, if the respective mills will cooperate with chip suppliers as well as equipment manufacturers, the problem of chip specifications can be more readily met. We should also study whether current chip quality specifications are suitable or whether some new phase of chip conditioning should be adopted in order to develop more uniform chips for better utilization of all available wood.

3. ***Chip Transportation:*** This is one of the most important factors in the development of the chip program. Our industry should work with the various systems of transportation (water, railroad, truck and conveyor companies, both air and belt) in order to develop the type of equipment most useful for the handling of wood chips.

4. ***Outside Chip Storage:*** The outside storage of chips has developed primarily because of the over-production of purchased chips. Chip storage piles have proven to be most successful and some chips have been stored for as long as three years. We should continue to analyze this method of storage to better determine the best system which will assure the most favorable storage procedures.

CHIP BARGES haul chips for some West Coast mills. Transportation is one important factor in chip program development.

With positive top grab-arm pulpwood control, and a loading height to 13', the TD-20 Skid-Grapple can "spot-load" accurately on truck, rail car, or cold deck.

NEW TD-20 SKID-GRAPPLE...

loads two cords per pass... keeps 17 ten-wheel trucks "cycling"!

Owned by Raoul Bisson & Fils, Senneterre, Quebec, this International Drott TD-20 Skid-Grapple "racks" an 8- to 10-cord load in only four passes—and while working under rough, rolling terrain conditions!

Outfit is loading 16-foot pulp on a Canadian International Paper Company job. It keeps 17 ten-wheel trucks in cycle—22 hours daily—in an area where 35° below zero is usual hauling weather!

The new TD-20 Skid-Grapple gives you mass-production pulpwood loading or decking. It has the fast mobility of a 6-speed, full-reverse transmission plus Shuttle-Bar forward-reverse control!

And this new power giant has the stability of 7-rollers, (109-inches of track on the ground)—for carrying heavy pulpwood loads over uneven terrain. For full-time, all-weather pulp-handling production, the TD-20 has positive, go-anywhere traction!

Measure TD-20 Skid-Grapple capacity. See how its new, advanced features team-up with logger-designed top grab-arm control—to stabilize the load, anywhere! Prove the downtime-prevention advantages of exclusive shock-swallowing Hydro-Spring. Or for other sizes of Skid-Grapples, see the TD-15, TD-9 or TD-6—each one the proven top producer in its size class. Ask your International Drott Distributor for a demonstration!

The Skid-Grapple's lower arms push into the *frozen-fast* pile —top grab-arm clamps down securely—then the Skid-Grapple's pry-action break-out wrenches loose another payload.

International Harvester Company, Chicago 1, Illinois
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General Pulpwood Industry Session

GENERAL SESSION PANEL: From left are Dr. A. J. Coutu, North Carolina State College; Donald J. MacLaurin, Institute of Paper Chemistry; Harold L. Mitchell, Forest Products Laboratory and P. R. Wheeler, Southern Forest Experiment Station, New Orleans, La.

Wood Density Shows Wood Quality

Specific gravity appears to be simple, useful index to evaluate wood; Mississippi study shows many variables affecting density

By HAROLD L. MITCHELL, Chief, Division of Timber Growth and Utilization Relations, Forest Products Laboratory, and P. R. WHEELER, Chief, Division of Forest Economics Research, Southern Forest Experiment Station, New Orleans, La.

● The Southern pines make strong kraft paper. Southern pine poles withstand high winds and ice storms. Southern pine lumber has great strength. Much of the high quality of all of these products is associated with wood density—the specific gravity of the wood itself. The higher the specific gravity, the greater the production of kraft pulp and the stronger the poles and lumber.

To illustrate application in the paper field: for every 2-lb. increase in wood density per cubic foot, one pound more kraft pulp is produced (**Fig. 1**). On a value basis, one cord of high-density Southern pine wood will yield almost twice as much kraft pulp as a cord of low-density wood. Variations in wood density, together with equally great variations in solid volume of wood in a cord (attributable to differences in stocking, bark thickness, and bolt length, diameter, and straightness) cause the cord to be a very unreliable unit of measure of pulp yields. These variations are the chief reason many Southern companies have turned or are rapidly turning to purchase of pulpwood by weight.

Density a Useful Index

In the search for an index of the suitability or quality of wood for such various purposes as pulp, poles, and lumber, it seems reasonable to test specific gravity. Density appears to be the simplest and most useful single index of these qualities for the Southern pines.

Systematic observations of specific gravity of pines were included in the cooperative third Forest Survey of Mississippi with these objectives:

1. To obtain information on the intrinsic wood quality of the Mississippi pine resource.
2. To learn more of the effects of environment on wood quality; such information has obvious value to forest managers.
3. To seek trees of superior wood quality, as well as superior form, growth rate, and other desirable characteristics, for use in genetic studies.

In the Mississippi Forest Survey, sample points were established at intersections of a 3- by 3-mile grid over the entire state. From these points more than 8,000 pines were selected by an angle-gauge with probability proportional to basal area. In addition to the usual measurements of tree diameter, height, log grade, and the like, the crusing teams took an increment core to or close to heart center at

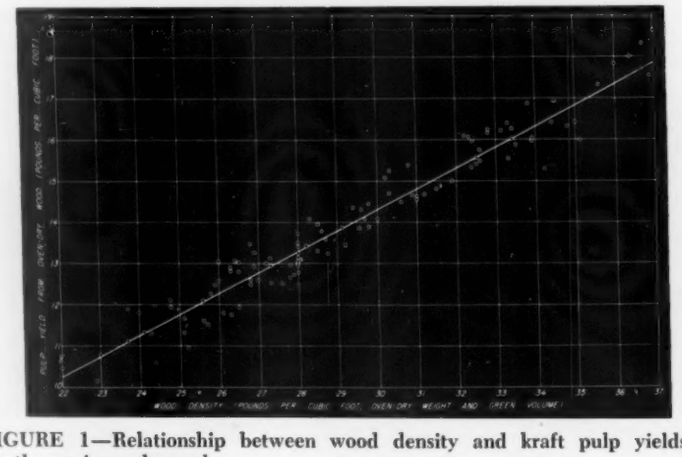

FIGURE 1—Relationship between wood density and kraft pulp yields of Southern pine pulpwood.

breast height for each pine 3 in. and larger in diameter.

The cores were obtained with standard increment borers, precisely calibrated for bore, and green length was carefully measured. Labeled so that they could be correlated with other measurements and classifications, the cores were sent to the U.S. Forest Products Laboratory for determination of specific gravity, age.

Specific gravity determinations are based on the ratio of the weight of oven-dry wood to the weight of water having the same volume as the green wood. About half of the green weight of Southern pines is comprised of water, or, to state it in another way, the weight of water in green Southern pine is about equal to the oven-dry weight of wood. A specific gravity of .450 means that the oven-dry weight of a cubic foot of green wood weighs 45% of the weight of a cubic foot of water (62.4 lbs.), or that it has a density of 28.1 lbs./cu. ft.

An increase of 0.01 in specific gravity is equal to an increase of almost 50 lbs. in the dry weight of an average cord of Southern pine pulpwood. And 50 pounds more dry weight means 25 more lbs. of kraft pulp.

Figure 2 shows the range of variation in the specific gravity of the pine increment cores obtained in Mississippi. It is noteworthy that there is far more variation within species than between. Loblolly pine ranges from 0.25 up to 0.80, just short of the best slash and longleaf. Part of this variation is due to sampling error, and some is due to environmental and other factors that affect specific gravity. Of these factors, age of the pith has the strongest influence. Others are growth rate, volume, and diameter—each reflections of stand density, soil moisture, other site characteristics.

Another highly important part of this variation is due to inherent differences between individual trees within a species or within a racial strain. It is these hereditary differences that the geneticists are studying, and upon which high hopes are based. Whatever the reasons for variations—genetic, sampling error, or environmental—they are the range within which technicians have to do future research.

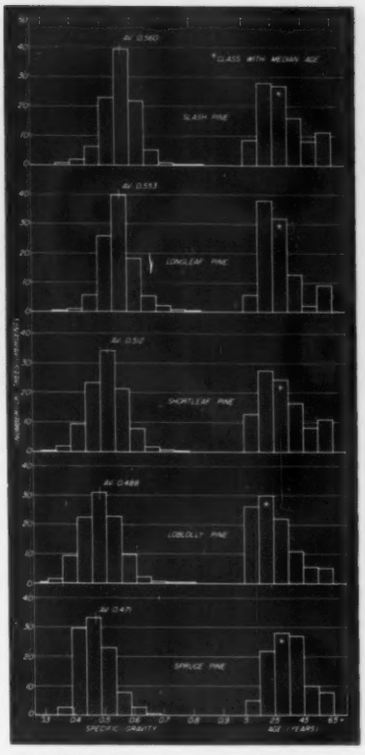

FIGURE 2—Frequency distribution of core specific gravity and age at breast height (3 in. dbh and over) for five species of pine in Mississippi. Number of trees in sample: slash, 576; longleaf, 992; shortleaf, 2815; loblolly, 3752; spruce pine, 178.

Age Influences Density

As has been noted, age has a strong influence on density. **Figure 3** indicates that the average relationship between age and increment core specific gravity for each of the 5 species of pine in Mississippi is clearcut and highly significant. It also shows that the 5 species fall into 3 distinct and significantly different groups over the entire range of age. Longleaf and slash pine group closely at the top, loblolly and shortleaf are intermediate, and spruce pine is by itself at the bottom. The differences in core specific gravity between the groups are significant for the ages shown.

An increment core, at breast height, of course, gives just a very small sample of the specific gravity of a tree—and from the lower bole at that. Earlier work has shown that specific gravity tends to decrease up the tree. Thus to determine tree specific gravity it is necessary to convert core gravity to weighted averages that apply to the total merchantable volume of the boles.

A tentative relationship between core gravity and tree gravity has been worked out by Wahlgren and Fassnacht. They also used calibrated increment borers to determine core gravity at breast height for 100 trees of each of the 4 principal Southern pines within a limited range of diameters and sites in Mississippi. In cooperation with International Paper Co., the trees were felled and discs cut from the top of each merchantable pulpwood bolt. At the Forest Products Laboratory the specific gravity of each disc was determined and the average specific gravity for the merchantable portion of each tree was calculated.

The average curvilinear relationship between breast height increament core specific gravity and whole tree specific gravity for each species is shown in **Figure 4.** The correlations are satis-

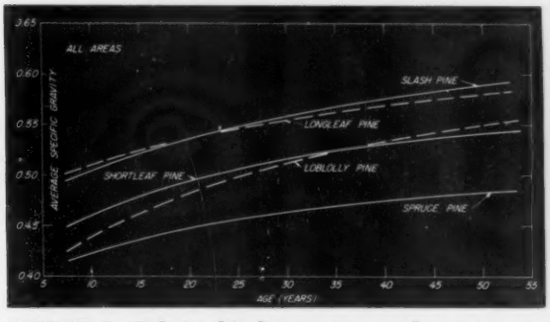

FIGURE 3—Relationship between age and average core specific gravity at breast height for five species of pine in Mississippi.

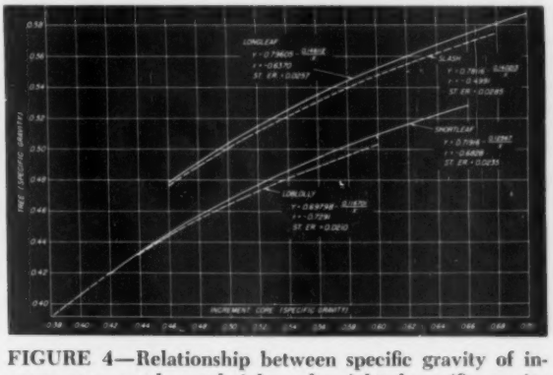

FIGURE 4—Relationship between specific gravity of increment core at breast height and weighted specific gravity of total merchantable volume of the tree for four species of pine in Mississippi. Based on data from 100 trees of each species.

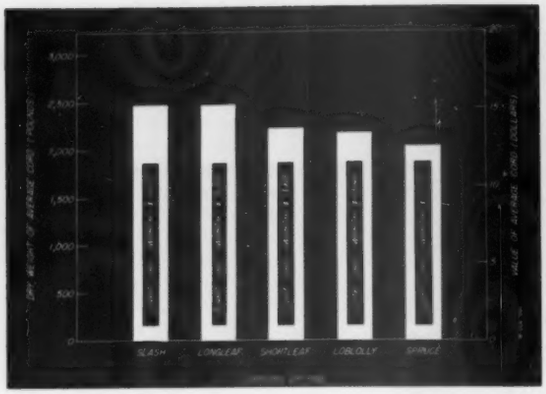

FIGURE 5—Comparison of average dry weight and estimated value of standard cord of wood from different species of pine in Mississippi at age 30, breast height.

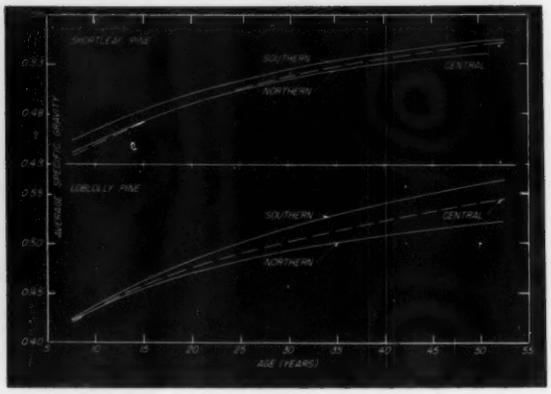

FIGURE 6—Relationship between age and average core specific gravity at breast height for shortleaf and loblolly pine in north, central and south Mississippi.

factory, and the regression equations may be used with reasonable reliability to estimate tree gravities from core gravities within the range of the data. Because the data are limited in range, they should be used cautiously in predicting tree gravities at the extremes of core gravity.

Further analysis of the relation between increment core and whole tree gravity indicates that for some species tree diameter and age are significant joint variables. As more and wider ranging data are collected and studied, still other variables, such as merchantable height may be found significant.

Relationship to Dry Weight

To show how the tree gravities of the 5 species may be reflected in the dry weight and value of average cords of wood, **Figure 5** has been prepared. Dry weights are based on the average tree specific gravities attained by each species at 30 years of age, applied to a standard 4- by 4- by 8-ft. cord. Values were calculated by assuming that an average cord has 74 cu. ft. of solid wood, with a density of 30.7 lbs./cu. ft. (the avearge of the 5 species at 30 years of age). Its dry weight is thus 2,272 lbs., and, at $14 per cord, it consequently is worth 61.6 cents per 100 lbs.

At 61.6 cents per 100 lbs., dry weight, the values in Figure 5 for longleaf and slash pine are about 10% greater than those for shortleaf and loblolly, and those for spruce pine about 10% less—a total range of some 20%. Stumpage values show a similar range. At $5 per cord stumpage, average dry-weight value calculated as above is 22 cents per 100. Then for the several species at age 30, pulpwood stumpage values would be $5.43 for longleaf and slash pine, $4.87 for shortleaf, $4.79 for loblolly, and $4.48 for spruce pine.

It must be amphasized that these values are based on averages derived from an equispaced, systematic sample of the pine population of Mississippi. Because of the variation within species (Fig. 2), the average values cannot be expected to represent any particular tree or stand. While slash and longleaf pine avearge higher in specific gravity than the other species, some individuals have core gravities below 0.30. Conversely, individual spruce pines ranked in the upper half of the wood density scale.

Location Causes Variables

Geographic location is another cause of variation. Core gravities, for each of the age classes, are progressively higher from north through central to south Mississippi for shortleaf and loblolly pine, the two species that range the full length of the state (**Fig. 6**). Other work in progress indicates that longitude has an effect as well as latitude—so that the increase in core gravity appears to be broadly diagonal, that is, from northwest to southeast. A great deal of research will be necessary to determine the relationships implied by this variation.

Now it can only be speculated whether the geographic location is associated individually or in combination with length of growing season, soil, rainfall, geographic race, or other factors. Heredity aside, it seems likely that some combination of conditions that makes greater than average amounts of moisture available during the latter part of the growing season (when the heavier summerwood is laid down) eventually will be found most strongly related with higher core gravities.

Area differences in core gravity, as the differences between species, are reflected in the dry weight and intrinsic value of given volumes of pulpwood, lumber, poles, and other products, as well as in suitability of the wood for such products. Volume growth in an area at a given age may magnify these differences. To illustrate these differences, tree gravities were applied to the average cubic volumes attained at 30 years of breast-height age to determine dry weights for average trees of the several species. Loblolly and shortleaf pine tree weights were determined for north and south Mississippi (**Fig. 7**).

Because of its more rapid volume growth to age 30, loblolly is superior to shortleaf pine in both the north and south portions of the state, although its core and tree gravities are generally less than those of shortleaf. Amazingly enough, tree weight of the lowly spruce pine at age 30 ranks next to loblolly and ahead of longleaf, slash, and shortleaf pine in terms of dry weight, again because of its more rapid volume growth.

For one species, longleaf pine, an average tree dry-weight yield table (based on levels of growing stock as they now exist at the various ages) has been developed for breast-height ages from 20 to 70 years (**Fig. 8**). This is an illustration of the sort of yield table forest managers may be using in the future as the relatively simple and single measure of weight replaces the multitude of greatly varying and often inaccurate, bolt and log rules now in common use. Certainly for the pulp mill it makes a great deal more sense to pay for wood in terms closely related to the final product than the often far from satisfactory, highly variable cord or unit.

Changes in forest management that may be based on these and subsequent findings can only be guessed at now. It does seem obvious that to

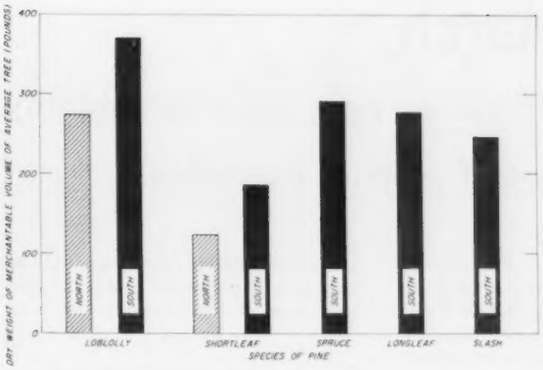

FIGURE 7—Average merchantable dry weight per tree at age 30, breast height, for various species and areas in Mississippi.

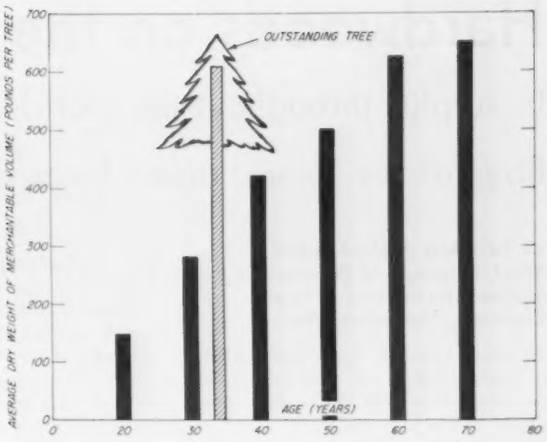

FIGURE 8—Merchantable dry weight of outstanding longleaf tree 34 years of age at breast height compared with dry weights of average longleaf trees at various breast-height ages.

produce the greatest pulp yield and strongest wood, Southern pines will be grown to the levels of stocking found most profitable at various rotation ages for each of the several products. Thinnings will continue to be made, but probably in a manner to insure the greatest rate of dry-weight growth per acre—the rate of volume growth and rate of increase in tree specific gravity combined. And more attention will be paid to developing strains of pines that will produce wood of high specific gravity.

Individual, Superior Trees

To search out individual trees having superior wood quality was the third objective of this study. During the course of gravity determinations at the Forest Products Laboratory, cores having density well above average were noted. The information was promptly sent to the Southern Institute of Forest Genetics where, by use of Forest Survey records, these high specific gravity trees were relocated for further study. An independent determination of specific gravity at breast height was then made from two additional cores. The forest geneticists also made notes on tree form, branching habits, size of limbs, and susceptibility to insects and disease.

While some of the trees with dense wood turned out to have relatively poor form, low growth rate, or other undesirable characteristics, a few were exceptionally good in these attributes. In Figure 8 the best longleaf pine is superimposed on the average for the species. The core specific gravity of this tree is 0.748; it has a merchantable volume of 16.2 cu. ft. at 34 years of breast-height age. This longleaf pine, with an estimated dry weight of 607 lbs., is about twice the weight of average trees of its own age, and has almost reached the average dry mass of trees twice its age.

It is evident that average tree dry-weight yield tables will provide a realistic and useful standard of comparison for genetically rating plus-trees according to their pulp yield and strength characteristics. Similar curves are being developed for other pine species for applications in forest management, genetics, and economics.

Locating individual trees in the manner described unexpectedly served to steer geneticists to areas where additional superior trees were likely to be found. No doubt some of the trees in such localized areas of "high wood density" are descendants of a super tree harvested long since. In any event, once outstanding trees are located they can supply scion material for vegetative propagation and can be cross-bred under controlled conditions at the Southern Institute of Forest Genetics to determine how much of their superiority can be transmitted to future generations.

That there are living Southern pines with still higher density than those located is evident from wood samples tested over the years at the Forest Products Laboratory. One problem is to identify superior trees before they are harvested. Unfortunately, a tree with high specific gravity looks like any other tree externally, so wood density must be sampled. Because the odds of stumbling upon a super tree are about 1 in 10,000, some systematic method of search must be depended upon. The screening process used in Mississippi by the Forest Survey and the Forest Products Laboratory holds promise, other efforts are being made in Arkansas, Missouri, Florida.

Well-founded recommendations for putting into practice this new knowledge cannot be made until a great deal more work is accomplished. Too many variables must yet be found and analyzed. So far, the greatest value of the study may be to focus attention on the need for a more adequate concept of wood quality.

Still more precise relations between growing conditions and the production of merchantable wood in terms of dry mass must be determined over a wider range of site qualities. The Arkansas Forest Survey is making observations of soil-site quality for correlation with specific gravity. This work should lead to better understanding of how amount of rainfall, length of growing season, and other environmental factors, including various timber stand characteristics, affect tree growth, and probably wood density.

More immediate practical application may be in the reporting of the forest resource in terms of the dry-weight tons of pulpwood, sawtimber, poles or piles available. Then pulp companies can more closely estimate the resource in tons of pulp. The lumberman will be better able to determine the proportions of dense structural lumber, timber, and heavy dimension. And the pole and pile industry can deliver high strength materials to order. All should be one step closer to meeting the future demands of what bids fair to be a wood-hungry expanding population for products of specified quality.

Hardwoods on the March

In surplus throughout the world, hardwoods may become majority fiber of the future, aided by revisions of pulping operations

By DONALD J. MacLAURIN
Chief, Pulping and Papermaking Section, The Institute of Paper Chemistry, Appleton, Wis.

● About one-fifth of our tree harvest is used as pulpwood. This pulpwood provides about 96% of the fiber produced by our pulp and paper industry. The other 4% is from straws, bagasse, and cotton. Hardwoods are an increasingly important part of this pulpwood supply.[1,2,3] As recently as Sept. 1958, a group of distinguished scientists from this country met in Montreal, Canada, with their colleagues from other important pulp manufacturing countries of the world, and discussed many of the basic aspects of hardwoods as related to our industry. Their findings[4] give a sound background on the situation.

Table I presents an analysis of the sources of domestic pulp fiber. Of particular interest is the indicated trend that an increasing amount and proportion of our expanding fiber production is coming directly as virgin fiber from trees, whereas the actual amount of reclaimed fiber is decreasing. Undoubtedly the boundless ingenuity of the papermaker and the converter, in extending and diversifying the uses of paper, is increasing the difficulty of obtaining fiber from waste paper. Wet-strength papers, papers treated with resins, or waxes, or asphalts, papers with films and coatings, all present difficult problems in fiber reclamation. However, even if the over-all fiber economy is thus satisfactorily balanced at present, the view ahead certainly emphasizes the probable need of increasing not only the amount but also the proportion of fiber being recycled. This appears to be a problem suitable for stepped-up research and study now.

Table II summarizes our national inventory of growing trees, and also indicates the kind of changes that are taking place in that industry. Perhaps the most striking inference from these data is that our softwood inventory is just about holding its own, whereas our hardwood inventory is building up. Of course, our softwood inventory is twice as large as our hardwood inventory, but nevertheless hardwoods are on the march. They may well be the majority pulpwood before the pulp mills being built today become worn out.

Fiber to Come from Hardwoods

Now combine the data in Tables I and II and couple them with statistics on our projected fiber production and consumption. Best guesses suggest that fiber production in 1975 will be about double that of 1950. It seems obvious that softwood trees cannot continue to supply over 80% of our fiber. For example, Southern pines now supply nearly half our total fiber, and their growth and drain are about in balance; hence, no greatly increasing amounts of fiber should be expected from them, at least until additional trees become available on presently idle or understocked land.

On the other hand, note that we have a larger volume of oaks than either Southern pine or all the Northern softwoods west of the Rockies, and that our oak inventory is gaining rapidly. It seems inevitable that oaks in particular, and all the hardwoods

TABLE I. PRODUCTION OF FIBER—U.S.A.[1]

	1954		1955		1956		1957	
	Million Tons	Percent of Total	Million Tons	Percent of Total	Million Tons	Percent of Total	Million Tons	Percent of Total
Woodpulp	18.3	[65.8]	20.7	[67.0]	22.1	[69.0]	21.8	[69.6]
Waste paper	8.0	[29.8]	8.9	[28.8]	8.8	[27.5]	8.4	[26.9]
Total from trees	26.3	[95.6]	29.6	[95.8]	30.9	[96.5]	30.2	[96.5]
Other plant fibers	1.2	[4.4]	1.3	[4.2]	1.1	[3.5]	1.1	[3.5]
Total fiber	27.5	[100.0]	30.9	[100.0]	32.0	[100.0]	31.3	[100.0]

TREE SPECIES SOURCES OF WOODPULPS—U.S.A.[2]

	1954		1955		1956		1957	
	Million Cords	Percent of Total	Million Cords	Percent of Total	Million Cords	Percent of Total	Million Cords	Percent of Total
SOFTWOODS:	24.5	[83.9]	27.6	[82.3]	29.1	[81.3]	29.3	[82.8]
Southern pine		47.2						
Spruce & firs		14.3						
Hemlock		9.6						
Jackpine		2.3						
Slabs, etc.		6.2						
Other		4.3						
HARDWOODS:	4.7	[16.1]	5.7	[17.3]	6.7	[18.7]	6.1	[17.2]
Southern mixed		5.3						
Poplars		4.1						
Northern mixed		3.3						
Slabs, etc.		0.2						
Other		3.2						
TOTAL:	29.2	[100.0]	33.3	[100.0]	35.8	[100.0]	35.4	[100.0]

[1] *PULP & PAPER*, vol. 32, no. 8 (July 10, 1958.)
[2] Bettendorf, H. J. *Fiber Containers*, vol. 42, no. 8:77-84 (Aug., 1957).

TABLE II. U.S. FORESTS GROWING STOCK—PERCENT 1953 TOTAL VOLUME*

[In brackets: ratio of net growth to cut]

All Species	All Soft-woods	All Hard-woods	Oaks	Beech Yellow Birch Maple	Cotton-wood, Aspen	Hickory	Sweet-Gum	Tupelo Black-Gum	Yellow Poplar	Red Alder	Other	
						NORTH						*For comparison:* Doug.-fir = 18.3% [0.46] South. pine = 9.5% [1.15]
21.5 [2.40]	4.4 [1.17]	17.1 [3.10]	5.4 [2.98]	3.4 [2.24]	1.5 [3.47]	0.7 –	0.1 –	0.1 –	0.4 [2.97]	– –	5.5 [4.15]	
						SOUTH						
22.0 [1.35]	9.9 [1.17]	12.1 [1.62]	4.9 [1.43]	0.2 [1.88]	– –	1.1 –	1.7 [1.60]	1.5 [1.60]	0.6 [1.02]	– –	2.1 [3.16]	
						WEST AND ALASKA						
56.5 [0.74]	54.4 [0.70]	2.1 [6.50]	– –	– –	0.4 –	– –	– –	– –	– –	0.7 –	1.0 –	
						U. S. TOTAL						
100.0 [1.32]	68.8 [0.94]	31.3 [2.20]	10.3 [1.78]	3.6 [2.20]	1.9 –	1.8 –	1.8 –	1.6 –	1.0 [1.33]	0.7 –	8.6 –	

*Total 1953 volume growing stock on commercial forest = 516,935 million cubic feet.

Source: U.S. Department of Agriculture, Timber Resources for America's Future (Jan., 1958), Tables i, 10, 60, 61, and 62 of appendix.

in general, must provide an increasing amount and greatly increasing proportion of our fiber. While these inferences from inventories have a degree of uncertainty in them, and the speculations on growth, mortality and cut from forests may well be poor, it is concluded that there is clear evidence that we will want increasing amounts of fiber, and that an increasing proportion of that fiber must come from hardwoods.

Let us briefly recall that the inventory situation on hardwoods is not limited to America. Hardwoods are a growing surplus all over the world. In the great rain forests of the tropics they are a vast untouched source of fiber. The world supply position on fiber is not inexhaustible. A small increase in per capita consumption of paper in those vast populations now using hardly any could skyrocket world fiber demand. Thus, everything we do to learn about and use hardwood fibers here in America could serve well both ourselves and vast peoples overseas.

We convert trees to woodpulp by several familiar processes to obtain a wide spectrum of pulps and pulp properties. Over half of our fiber is obtained through the kraft process, and the rest about equally through the sulfite, groundwood, and semichemical processes. In general, hardwoods can be pulped by the kraft, sulfite, and semichemical processes. There are some minor exceptions, just as there are for some softwoods.

Hardwoods present more of a problem to the straight groundwood process. The less dense species, such as aspen and cottonwood, can be ground to yield a commercially acceptable grcundwood pulp, though it is not quite as strong as softwood groundwood. The denser hardwoods such as oak and beech have not been sucessfully ground by the simple groundwood process. However, the newer variants of mechanical pulping such as chemigroundwood, and cold soda, do give commercially acceptable pulps with a wide range of properties from practically all the hardwoods, particularly those of higher densities. Just as with softwoods, there are problems in any hardwood pulping operation. Most of these are now understood and remedied. The present broad picture is that pulping processes are available for our hardwoods.

Major Revolution Coming

In considering the whole pulp mill operation of converting trees to fiber, we should not forget that we appear to be on the verge of a major revolution in pulping processes and equipment. Our present typical pulping operation is a single-stage large batch. There are some single-stage continuous pulpers. At the experimental and pilot plant level, and in a few mill-size operations, a changing pattern is being born.

The traditional rigid divisions between the several chemical processes and the mechanical process are disappearing. Merging and hybridizing of chemical and mechanical processes is taking place. For example, there are processes now which will have an acid stage followed by an alkaline stage. Others start with one acid stage and have a second modified acid stage.

The possibilities of countercurrent continuous pulping are being explored. This would give rise to many possibilities in the selective removal of unwanted components from the wood. Multistage batch and multistage continuous systems are on the way. Smaller units with greatly increased pulping rates, which would be more easily spotted alongside lumbering operations, are not impossible before too very long.

This seething revision of the classical pulping operations will undoubtedly widen the possibilities for fiber production from hardwoods. It should increase the flexibility of pulp mill operation, so that mixtures of woods and species changes will be more easily handled. It could also increase the amount of fiber, both softwood and hardwood, we can economically obtain from logging residues and slab, shavings, chips, and blocks from sawmilling and other woodworking wastes. For here is certainly one possible source of fiber which will have to be much more fully exploited—particularly from hardwoods.

Other Hardwood Hurdles

That hardwoods can be pulped is of course a necessary condition for their being a source of fiber. Before that, though, they must pass over several other hurdles ahead of the pulp mill. Pulpwood procurement and preparation are very important aspects of hardwood utilization. Frequently, the cutting, hauling, storing, barking, and chipping problems are more complex for hardwoods than for softwoods. None of these problems, though, prevent the use of hardwoods. Economically, they may impose varying degrees of restriction. Such problems can and are being solved or avoided.

Many corporations in our industry have developed a pulpwood supply, frequently hardwood, based on "farmer's wood"—the private woodlot owner, perhaps with a truck. Tree Farms of America is a well-known and significant program in this area. Perhaps this approach to hardwood procurement through the small-scale operation can be expanded to the

over-all benefit of our national fiber economy. This approach would seem to avoid the difficulties of cutting hardwoods on the same large-scale shows which are so useful for softwoods.

Chemical debarking has been shown to be one possible way around the barking problem. Another approach which may have considerable merit is to do little or no barking. Instead, chip the unbarked wood, pulp the chips, bark and all, and then screen out the remaining bark after cooking with the fairly new type of cleaner employing the free vortex principle.

Questions on how best to harvest and prepare hardwoods for pulp manufacture naturally lead to the broader problems of the basic needs in pulpwood production. Jahn[5] raises such pertinent questions as why and how do trees grow? What kind of fiber is wanted? When these and similar questions are set against the general need of more and better fiber per acre per year, it seems that we are short on basic information.

To tackle these intelligently will undoubtedly require the best kind of combined operations between the many aspects of the profession of forestry and all the sciences and technologies concerned in converting pulpwood to fiber. We in the pulping and papermaking end have a task of defining our needs, and those in the growing and harvesting end also have a task in helping to achieve the best possible results from the available forest areas. The recently formed TAPPI Forest Biology Committee[6] is a good move in this bridging operation.

Qualities of Hardwood Pulps

There seems to be no question that there is an abundance of hardwoods and that they can be converted to woodpulp. Let us now consider the papermaking properties of these pulps. From a fiber property, and hence papermaking point of view, hardwood and softwood pulps have certain distinct differences. Each type of pulp reflects to some degree the wood from which it came.

Table III makes some very generalized and idealized comparisons of the physical dimensions of hardwood and softwood fibers. It will be realized that these data merely approximate the hypothetical, typical average fiber. In actual pulps, each fiber dimension is a point on a fairly broad distribution curve of that dimension.

Hardwood fibers are about one-third the length and width of softwood fibers, 25 fibers to the inch for hardwoods compared with 8 for softwoods. The relative lumen diameters and cell-wall thicknesses recall that the softwood fiber has a large empty core. It's a thin-walled, large bore tube, compared to the smaller diameter, but relatively thick-walled fine bore tube of the hardwood. The less dense hardwoods tend to have thinner walls and larger lumen diameters, whereas the denser the wood, the thicker the cell wall.

TABLE III. GENERALIZED COMPARISON OF TRACHEIDS

	Hardwood	Softwood
Fiber length	L	3L
Fiber diameter	$\frac{L}{100}$	$\frac{3L}{100}$
Lumen diameter	$\frac{L}{500}$	$\frac{12L}{500}$
Wall thickness	$\frac{4L}{1000}$	$\frac{3L}{1000}$
Volume	V	27V (Uncollapsed)
Weight	W	10W
Fibers, lb.	5-10 billion	¾-1 billion

The length differences between the fibers are well known. This is perhaps not so of the geometry of the cell cross section. It will be agreed that thick-walled fine bore tubes will be much more difficult to collapse than thin-walled, large bore tubes. The relative length of hardwood fiber has fairly conclusively been shown to result in lower tear values for sheets from hardwood pulps.

In this connection, it is of interest to note that the particle length distribution curves of softwood fibers and even rag fibers, when these fibers are beaten to typical papermaking condition, have only about 10% of the individual lengths greater than the lengths of unbeaten hardwood fibers. This suggests that we could possibly compensate for the shorter length of hardwoods during stock preparation. This is not a new idea, but as typical hardwood pulp fibers have a tendency to break into shorter lengths more easily than softwood fibers under present refining techniques, it seems reasonable to advocate more intensive study of refining of hardwoods alone and mixed with softwods.

The geometry of the cell cross section is a most important distinguishing characteristic of hardwood fibers. which perhaps has not been sufficiently considered. These fine bore, thick-walled tubes are not collapsible to ribbonlike structures as are the larger bore softwood fibers. This is an important factor determining the refining and forming behavior of hardwood fibers and the properties of sheets from them. In particular, the geometry of hardwood fibers and the considerably greater number of them in a given weight tend toward sheets with better formation, higher bulk, opacity, softness, absorbency, and smoothness, and better dimensional stability and improved watermarking potential, all relative to these same properties in softwood fiber sheets.

Chemical Differences

In addition to these significant physical differences between hardwood and softwood fibers, there are chemical differences in the whole wood which are of economic and process significance and which contribute in part to their fiber and papermaking properties.

Hardwoods contain less lignin than softwoods—about 22% compared with 28% for softwoods. Lignin is unwanted in most woodpulps.

The other main portion, the carbohydrate fraction, contains the cellulose and the hemicellulose. Hardwoods are about 54/21% cellulose:hemicellulose, and softwoods 52/17%. There is good evidence that the cellulose chain length is essentially the same in hardwoods as in softwoods.

The hemicelluloses are mainly mannans in softwoods and these probably are somewhat stronger bonding agents than the predominantly xylan hemicelluloses of hardwoods. Thus, hardwoods have about the same amount and the same kind of cellulose as softwoods. But they have significantly more hemicelluloses than softwoods.

In papermaking, the hemicelluloses mainly serve as adhesives in fiber-to-fiber bonding. When hardwoods are pulped to preserve the maximum possible hemicellulose content, as in the neutral sulfite process, sheets from them are stiff and snappy, much more so than similar sheets from softwood. This simple fact is an important contributor to the impressive expansion in containerboard. Excellent corrugating medium can be made from hardwoods.

If these high hemicellulose hardwood pulps are bleached, then we get a very good yield (about 55%) of a very easy-beating, glassine-type pulp. Hardwoods do contain some extractives and resins, though they are quite different and perhaps less troublesome than the pitch found in softwoods as has been fully discussed by Mutton[7].

The interrelation of all these chemical differences and the physical differences is not fully known, nor does it seem that they are fully exploited. There is, though, some very basic research going forward in this area.

About 7% of our chemical woodpulp is converted to films and filaments

such as cellophane and rayon. Apparently, except for one mill which does use hardwoods, all of this type of chemical woodpulp is obtained from softwoods. There are admitted technical problems in making these dissolving pulps from hardwoods, yet it is being done with indicated commercial success. This is an area where hardwoods would appear to be the only reasonable major long-range source of cellulose. The progress in the production of these special pulps was recently surveyed by Jahn[5], who pointed out that processes are available for making good dissolving pulps from hardwoods.

Future of Hardwoods

What, then, does the position of hardwoods in the pulp and paper industry appear to be? They are in good supply. Their inventory is increasing. They can be harvested and pulped, admittedly with some troubles. For certain papers and boards such as bond, book, and corrugating medium, they are used to advantage as either part or all of the fiber furnish. Out ahead, the revolution in pulping techniques and a growing spectrum of new paper and board products from our industry, and the economic pressures of supply and demand must lead to increased use of hardwoods. Our problem seems to be how shall we use them, and how their use can be increased. Here are some suggestions:

(1) Obtain a better understanding of the over-all optimums for using our available forest lands, particularly for fiber production. What species, and what strains of these species shall we grow where? Obviously this calls for the maximum exploitation of the possible gains from silvicultural practices and genetic improvement of trees.

(2) Learn considerably more about the morphology, fine structure and chemistry of the known wide range of fibers from domestic hardwoods. Now we know much more about softwoods fibers in these areas.

(3) Deliberately search for ways and places to increase the percent of hardwood fiber in our papers and boards. It seems certain that softwood fibers are now being used in many products where hardwoods would do as well or better. Perhaps there will have to be some adjustment in the acceptance judgment on what is a desirable or necessary set of properties in a sheet.

Of course, hardwoods and softwoods will always be different. This can be considered an advantage to the pulp and paper industry. It gives us a wider range of fibrous raw materials, which with better understanding, we will be able to use to still further expand and broaden this dynamic industry.

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Improving Small Woodlands

Apathy of small woodlands owner and land tenure changes are some reasons for low levels of forest management on small woodlands

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● The objective of this brief paper is to focus on economic conditions facing the small woodland owner that may be related to his general apathy towards this enterprise. The objective amounts to a challenge of the belief that this apathy is present because of the lack of technical information. This paper will purport to show that this explanation is far from complete and will attempt an outline of alternative courses of action aimed at improving small woodlands. To do this in a preliminary way two general areas will be discussed:

1. Factors that support the rationality in an economic sense of the present action of the small woodland owner.

2. Changes in economic conditions that have occurred as well as those that are expected that may change the present position of small woodland owners.

Let me first circumvent the problem of defining a small woodland owner and suggest that it may be an owner with 10 or upwards of 800 or more acres of woodland under his control. In many cases the apathetic woodland owner will be so classified because of the quantities of other assets he possesses rather than the size of his woodland.[1]

Why's of Low Level Management

Why does the small woodland owner practice low levels of forest management? Some factors are outlined below:

1. The small changes in productivity or small changes in discounted revenues that may occur as a result of learning activities associated with forestry are less than the costs associated with the learning phases involved.

2. Many small landowners have limited the use of investment capital in non-forest alternatives. As a consequence the expected rates of return in capital invested in these non-forest activities is high. As capital is required in timber resources development, the appropriate discount rate is that rate that could be earned in alternative investments[2]. This would imply high discount or compounding rates in any economic analysis of woodland alternatives.

3. Some landowners look to the

forest enterprise as a source of funds for emergency financing for non-forest productive items or for consumption. Such a forestry bank concept is perpetrated by limited capital conditions and/or high risk positions.

4. Generally, these landowners are classified as low income farmers who are unable to forego present decreases in consumption for future expected increases in productivity and subsequent increases in consumption. A combination of low income, limited capital and high discount rates necessitates a relatively short economic planning period or investment horizon.

5. A final factor that will be mentioned concerns changes in the value of leisure or underemployed time. Many of the people classified as low income producers have developed part-time farming opportunities as a solution to their problem; as a result the value of their leisure time has increased. The argument for large amounts of complementarity in labor use between forest and non-forest enterprises is substantially changed as a consequence of this effect of part-time farming developments.

These conditions reflect a need in the area of small woodland development to integrate technical and economic analysis in a more complete educational package. To simply state such a need is not my intention, but rather it is to discuss some general economic conditions facing agricultural producers that are related to such an association and to outline specific courses of action that may change this apathetic position.

Low Income Problem

The presence of an income problem and a price uncertainty problem in agriculture has received much attention and within the next few years will receive much more attention[3]. At the core of this low income problem is the idea that shifts in demand relationships for agricultural products are less than the shifts in the supply relationships for agricultural products.

Innovations and technology changes have encouraged the amount of products forthcoming at given prices at a greater rate than the increases in population, income and foreign trade have shifted the purchases of products at given prices. In the Southeast the low income farm people have responded by increasing the rate of out migration, expanding the number of part-time farming systems. And those who remain as commercial producers have acquired increasing quantities of assets under their control in order to increase resource efficiency. This changing environment has stimulated the need for alternative lines of production, for increased knowledge of principles and methods applicable for achieving increased resource efficiency, and a willingness to consider substantial changes in business organization.

HELPFUL HINTS FOR GOOD FORESTRY are given to many small landowners by representatives of "big" pulp and paper companies, in this case, West Virginia Pulp and Paper Co. in its Neighborhood Forestry program.

These economic forces have affected forestry conditions in the Southeast and may continue to affect the rate that forestry activities will develop. The opportunities for forestry growth may result from these economic forces alone but the opportunity to assist this change in the rates of growth is available. What forms may this assistance take?

Tenure Changes

The need for scale or increases in the size of woodland ownership or tenure under a single decision maker is critical for profitable forestry development. With extensive out migration and increases in part-time farming, the opportunities for farm woodland enlargement are encouraging. Organizational changes such as cash leasing systems, multi-unit developments and contract commitments can affect the size of the forestry enterprise. These organizational changes are substitutes for outright land purchases where land and capital assets are limited.

From 1940 to 1954 there had been a net increase in woodland acreage of about 25¾ million acres in the Southeast (**Table 1**). The large farms (greater than 220 acres total) control approximately 66% of the total woodland in the Southeast; in 1940 this class of farms controlled less than 50% of the woodland.

An increasing proportion of these changes is due to the acquisition of woodland holdings by corporate structures, but increases in woodland tenure by non-corporate entities are still very substantial. The basic ques-

TABLE 1. Changes in Woodland Ownership by Size of Farm, Southeast Area, 1940 and 1954

Size (acres)	1940			1954		
	Total farms	Total woodland	Percent woodland of total	Total farms	Total woodland	Percent woodland of total
	(thousands of acres)			(thousands of acres)		
0-29	14,089	1,168	1.3	10,152	1,373	1.2
30-219	153,269	42,457	48.8	110,748	36,898	32.7
>220	202,810	43,429	49.9	265,389	74,615	66.1
Total	370,168	87,054	100.0	386,289	112,886	100.0

Source: *Census of Agriculture*, 1940, Vol. III, General Report and 1954, Vol. II, General Report.

tion relative to this latter group is, at what size of woodland ownership does the forest enterprise become recognized as an integral part of the resource base of the farm?

Another way of stating this is, at what size of forest tract will the effects of high discount rates and short planning periods be offset by annual revenues received from a continuous harvesting system? Additional knowledge on this question would provide a material assist to those working on farm consolidations with forestry enterprise components.

A primary change in tenure conditions may require basic adjustments in the oganization of farm forestry activities. Analysis that would describe the effects of such organizational changes on net farm income would hasten these adjustments. For example, what are the income effects under multifarm unit developments, cash leasing systems, contract commitments or other forms of land consolidations.

Non-Forest Specialization

The commercial farmers adjusting to economic forces in the Southeast are tending toward large capital requiring enterprises. Over time this growth in product specialization has the effect of reducing internal alternative earning rates for capital. Expected reductions in the returns per dollar of additional investment, particularly in activities that do not require additional land, suggest increasing opportunities for additional investments in forestry type activities. As more favorable investments are exploited, alternative forestry investments are explicitly recognized by the management unit.

A major restriction on greater specialization, with resulting economies from large scale operations, has been the presence of many small farms. This condition is changing with reductions in the number of small and intermediate sized farms along with increases in the larger sized units (see **Table 2**). From 1940 to 1954, the number of all farms in the Southeast had decreased by about 23%. The only group of farms that showed an increase in number during this time period was made up of those greater than 220 acres in size.

These larger units average 95 acres more per farm in 1954 than in 1940 and have increased the average size of the woodland by more than 76 acres per farm. These owners may still be quite apathetic towards the forestry enterprise but the prospects for changing this position do appear more favorable.

TABLE 2. Number of Farms, Average Size of Farms, and Average Size of Woodland, in the Southeast, 1940 and 1954

Size	1940 Number of farms	1940 Avg. size of farms (acres)	1940 Avg. size of woodland (acres)	1954 Number of farms	1954 Avg. size of farms (acres)	1954 Avg. size of woodland (acres)
0-29	949,094	14.8	1.2	759,095	13.4	1.8
30-219	1,786,061	85.8	23.8	1,241,386	89.2	29.7
>220	272,015	745.6	159.7	316,126	839.5	236.0
Total	3,007,170	123.1	28.9	2,316,607	166.7	48.7

Source: *Census of Agriculture*, 1940, Vol. III, General Report and 1954, Vol. II, General Report.

Resource Use Alternatives

A third area of reference for changing the attitude of small woodland owners involves increased emphasis on farm management aspects that can serve to describe income effects from alternative courses of action designed to increase the efficient use of individual resources.

This increased emphasis would involve an explicit recognition of what types of forestry enterprises would be profitable, how large the timber enterprise should be and what factor combination in production techniques to choose in order to minimize cost in relation to output. Preferably the work on farm management aspects of forestry should involve complete farm planning, and it is in this connection that rather new techniques have come into use that are very efficient with respect to recognizing forestry alternatives[4].

With the use of linear programming procedures in farm management analysis, it is possible to evaluate forestry enterprises and at the same time recognize numerous non-forestry alternatives. With the inclusion of forestry enterprises it is possible to describe the effect of forest product price changes on farm organization, of leasing in or out of forestry land, labor complementarity and/or supplementarity, and, most significantly to describe the effects of varying discount rates on long range investments and on net farm incomes.

The recognition in farm planning of forestry activities is a relatively new but highly useful technique and one that will or should receive much attention from farm foresters. It appears that if such data were an integral part of the farm foresters management tools, his influence on the actions of decision makers relative to forestry activities would increase.

The problems of the small woodland owner are caused by limited resources and high risks relative to change. These same conditions account for most low income producers in agriculture. Solutions to such problems involve basic changes in the quantity of land brought under the control of a decision maker or changes in the size of farms. These changes in the scale of operation can be encouraged by organizational changes and more complete knowledge of income alternatives. Neither technical nor economic analysis presented as separate packages can materially influence the apathy of the small woodland owner.

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AERIAL SPRAYING WON THE BATTLE OF THE BUDWORM in New Brunswick and Quebec provinces in Canada. For six years an industry-government program sprayed some 9,300,000 acres. The budworm has all but disappeared and no spraying will be done in 1959.

Aerial Spraying: Plus and Minus

This useful and necessary tool—sometimes dangerous—requires careful planning and execution, and especially good public relations

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● It is evident that the public is confused about aerial spraying. One group demands that all spraying be stopped, another favors more and bigger spraying programs as the quickest, cheapest and easiest way to get rid of unwanted bugs regardless of what else we get rid of in the process. Some years ago—before the days of aerial spraying—when I was pulping and logging in Maine and Canada and trying to keep one jump ahead of the sawfly, the budworm and the birch borer, I could easily have sympathized with this point of view. But the logical approach, of course, is to find an intelligent balance between these extremes.

It is perfectly natural and right that so many people are concerned about this growing practice of spraying chemical pesticides from the air. It is something concerning which we can well take alarm, and the public is doing just that. On the other hand, aerial spraying is a tool which, properly understood and properly handled, can be useful. The pulp and paper industry is wary of its dangers and of public reaction to its use.

But it can reduce timber losses, so there are times when you feel you have to use it. It is in this connection that I would like to express some thoughts about what might be done to minimize the need for such spraying and how public understanding might be improved.

My organization, The Conservation Foundation, is a private organization, and we do not lobby for or against any specific legislation. Our activities lie entirely in the fields of research and education.

We have put out two reports on pesticides by Dr. John George (now with the Fish and Wildlife Service). The first (1957) was about the time of the USDA's spraying program of DDT in the Northeast to control the gypsy moth; and the second report came out in the autumn of 1958 on the USDA's colossal program to "eradicate" the fire ant in the South with the even more potent chemicals Dieldrin and Heptachlor.

Prior to this time, forest spraying had been going on for some years. Some public criticism had undoubtedly been received locally, but nothing like the public reaction to these two USDA programs. The public reaction to them has undoubtedly spilled over to private forest spraying programs. Now there is a real controversy. The public is becoming aware of the real, the possible, and the imaginary dangers of large-scale spraying programs, and has not distinguished between the two large shotgun operations just referred to and some of the more carefully planned and conducted forest sprayings. There is a very real distinction here and the public should be made aware of it.

Basis for Criticism

It is true that in these two surveys,

The Conservation Foundation has directed a certain amount of criticism at the USDA, in spite of the generally high regard that it has for this department. The gypsy moth program, although using only DDT at the rate of one pound per acre, caused enough real and imaginary side-effect damage to arouse the public, and especially those landowners whose property was sprayed without their permission or advance knowledge.

The big, long-range fire ant program seems to many to have been initiated without enough preliminary research or sufficient effort to inform the general public. There is even the question as to whether the fire ant is actually an economic pest or just a nuisance. Reports of damage to wildlife, domestic animals, earthworms and other desirable soil organisms cannot be ignored. This gigantic program, if carried out over a number of years, is really the spreading of poisons over our environment on a large scale.

All this, however, is not to say that the use of chemical pesticides, applied from the air, is not a useful and necessary tool that is here to stay. But it is a dangerous tool and one that needs to be used with great knowledge and care. My impression is people who own timberland, are not eager to use it and do so only when it is felt no other means will protect the timber capital.

We have studied many of the forest spraying programs, especially those to control the spruce budworm in the Northwest, the Northeast and in Canada. The New Brunswick, Canada, spraying program has probably been the largest one undertaken and has received the most publicity.

Pioneer Program in Canada

A forest spraying program of this magnitude was pretty much a pioneering endeavor. If you read the reports of those involved in this operation, you find that at the beginning there were many unknowns; as to the probable control to be realized, what damage would be done to other forms of life, how much of the forest had to be covered, and what were the best techniques and plans of operation.

These reports have been refreshingly frank about what was learned from year to year, and the changes made in conducting the program. There was considerable concern over the fact that they had to continue spraying over a number of years. But I understand that with the help of the infestation's cyclical nature and last spring's weather conditions, the infestation is now considered under control.

There is no doubt but what the spraying program, in the meantime, saved a tremendous amount of timber and the experience gained has been very valuable to other forest spraying programs.

This is a good illustration of the very important difference between the so-called "eradication" programs—as in the case of the fire ant—and "control" programs—as in the case of the budworm. No one expects to "eradicate" the budworm; rather the objective of the spraying, both in the Northwest and in the Northeast, has been to hold the line until natural controls are restored. It would create better public relations for the pulp and paper industry if the average citizen understood this difference.

Careful Approach in Maine

The spraying program in Aroostook County, Maine, last spring, had certain elements with regard to its preparation and execution we at The Conservation Foundation think are most interesting and significant.

The State of Maine Forestry Service, under the guidance of the then Commissioner Nutting, and Chief Entomologist, Robley Nash, carried on careful and extensive studies of the growing infestation of the spruce budworm in Maine, the incidence of parasitism, etc. for years prior to this program. A good argument might well have been made for spraying a couple of years ago over a larger area, but it was felt that the infestation was narrowing itself down.

Then a year ago the conclusion was reached that about 300,000 acres of spruce-fir forest in Aroostook County were set for a real explosive infestation the next summer, and that if the insect could be controlled in this reduced area, it might very well be licked in the state of Maine—at least for the time being. The state forestry people recommended that these 300,000 acres be sprayed with one pound of DDT per acre in June, 1958.

Maine people do not like to fool around with new and dangerous tools about which they have not sufficient experience or knowledge. So the commissioner and his department and the landowners went at the matter pretty carefully. First they consulted at length with the landowners involved, called a public hearing and explained the basis of their thinking. It was finally decided that the spraying operation should proceed, and the cost should be borne one-third each by the federal government, the state, and the landowners. They even consulted with every small landowner and the people living in the area and on the fringes; they explained the program, what it was designed to accomplish, and even warned of possible unfavorable, but what it was hoped would be short-term, side-effects.

Special Research Undertaken

The Maine Department also planned a research program to accompany the spraying, as extensive as their own limited budget and manpower would allow. At this point the timber landowners contacted The Conservation Foundation and suggested that perhaps we could provide additional research for which they were willing to put up funds.

As far as I know, this is the first time that the landowners themselves have supported research in connection with a specific spraying. But they wanted to know what effect, if any, this spraying would have upon seed germination and seedling growth, knowing from past research that DDT in some cases did affect the reproductive processes under certain circumstances, and that it had a cumulative effect in the soil which did not disappear for some years. Most people *thought* that at one pound per acre there would be no measurable effect on growth, but nobody knew for sure.

So we arranged with Dr. George Woodwell, at the University of Maine, to conduct a three-year research program to try to get the answer. An answer not only to determine whether reproduction of seeds and seedling growth is affected at one pound of DDT per acre, but also at what accumulation of even larger doses they would be affected. This experiment is being carried on now in the field, in the laboratory and greenhouses at the University of Maine. We believe this is the first such study as it applies to a spruce-fir forest. It is being conducted in close cooperation with the state people.

The state's research did not have funds to include an aquatic entomologist to study the effect upon insect life in streams and lakes, and its result upon fish life: what spraying does to the aquatic insect life; how long before it recovers, etc.? Such research has been done in connection with other sprayings and the state felt that they should include it in their program, but their budget did not allow it. They contacted us at The Conservation Foundation and we were able to get added support from the landowners in order to supply the state with an aquatic entomologist to work with them during the summers of 1958 and 1959. This whole thing has impressed us as an example of close cooperation between state, landowners, and outside organizations such as ours.

I was in Caribou, Maine, at the time of the actual spraying operation

and was impressed by the techniques being employed. As far as I know, their methods of application were as controlled and accurate as any that have so far been employed.

Accurate Technique

No one has any idea, unless they are on the spot, of the physical impossibility of perfectly spraying evenly one pound per acre with no points skipped and no overlap. Their technique seemed to be as close as physically possible to get it. Also, the weather is never with you. You have to contend with wind, updrafts, and innumerable other uncontrollable variables.

The public does not understand these problems. About all they know is that spraying is going on—they can smell it, even if they don't see it; they find a few dead fish on the shore of a lake, and the trout aren't biting as well as they did the week before.

As a result of this spraying, the state reports that there has been a very satisfactory kill of budworms, that the incidence of parasitism is highly satisfactory, and they feel that additional spraying another year will not be necessary. They also state that insect life in the streams was reduced, but that by August it was showing signs of recovering.

So it seems that here is an example of a well-planned, very carefully executed spraying program with the people of the area being adequately informed in advance about what was taking place. I have described this in some detail merely to point out that, although we have criticized the gypsy moth and the fire ant programs of the USDA, we understand that spraying is a tool which can be handled with proper caution.

Decide Not to Spray

Now let us take an example of where it was decided not to spray. There is a large area—600 square miles in the Province of Quebec with which I am familiar. The paper company which controls the stumpage has been pulping the area for some years on a cutting schedule that was planned to extend into the 1970's. The surrounding towns were prosperous—plenty of work in the woods. Then about three or four years ago, the budworm hit and hit hard.

For better or worse, it was decided not to spray, but rather to greatly step up the cutting schedule and try to keep ahead of the budworm and cram 15 years of planned cutting into three or four. The result was, of course, a great demand for woods labor. People came from all over to settle in the nearby towns and take advantage of the sudden boom.

Now—in 1959—it's all over. All that's left are a few jobbers cleaning up odd patches of hardwood for a local mill. Very little work is available. People are moving away. The towns are experiencing real depression. The boom has busted!

So this is another side of the picture—the social and economic implications for the area involved. The criteria upon which the decision of whether or not to spray must reckon with these factors.

Other Factors of Control

We have discussed so far only chemical pesticides and aerial spraying. The Conservation Foundation is deeply interested in the matter of every kind of control. Our aim is to foster more research; get more knowledge and encourage improved techniques of application. We recognize the built-in hazards of chemical control, and we do not hesitate to point them out, and to criticize what seems to us indiscriminate and poorly executed programs. But at the same time we do recognize the usefulness of the tool and that it is going to continue to be used. However, use of chemicals is only one of many possible control methods. We feel that other methods need to be better recognized, studied, and applied.

Other possible methods of insect control in forest lands include good silvicultural practices, which are basic to a healthy and productive forest. These practices are being increasingly understood and employed. The larger companies today are expending huge sums on such management practices as marking every tree to be cut—even over large areas, thinning operations, salvage cutting and elimination of high risk trees, logging techniques to reduce erosion; practices which encourage the growth of preferred species, attention to watershed protection —to name only a few.

When I was working in the woods, these were unhead of or at least were considered economically impossible. We never did any of those things—we cut out and got out and let the next generation worry about it. Fortunately, things are different today and the use of better silviculture practices by so many forest owners and operators assure a healthier forest for tomorrow.

But even in a healthy forest the cyclical nature of insect infestations demand the periodic use of direct controls aimed at the specific past. These direct controls fall into two general categories. First there is chemical control, and the most prevalently used today. The second is the control brought about by developing diseases specific to the insect to be controlled —artificial breeding and spreading of the particular insect's parasite (to establish a predator-prey balance), the use of disease viruses, hormones, etc.

Biological Controls

These and others may be lumped together and called "biological controls." We need to know more about them. They can be effective! It is encouraging that some university research departments as well as such concerns as Lilly, Merck, Pfizer and others are doing work along this line in both basic and applied research.

No thoughtful person expects that biological controls can 100% displace chemical controls, but surely the more effectively we can use them, the less chemicals we will need to use. The amount of research in biological controls—at present—represents about 15 percent of the total expenditure for specific insect control. Chemical research accounts for most of the other 85 percent. This is a pretty one-sided picture and urgently needs correcting.

Genetics—Burning

Another control—really in its infancy, but eventually may be of great importantce—is forest genetics—the development of better strains of species which are more resistant to insect damage and disease. Still another being used to some extent under special circumstances, is controlled burning. Pest control in the future will probably use all these methods but in more highly coordinated programs than we have today.

The Foundation's Program

Some of the things the Conservation Foundation is trying to do include the growth and reproductive studies we are conducting in Maine for the landowners, also our two pesticide reports. Stephen Bergen of our Research Staff is investigating possible and desirable areas of research—both basic and applied—in biological controls. Because of the lag in this area, we feel strongly that this type of control needs much more emphasis.

We have employed Dr. Robert Rudd, biologist on the faculty of the University of California, to prepare (for what we expect will be commercial publication) a book on the broad subject of Predator-Prey Relationships and the effect of the use of chemical pesticides on insect and animal life.

We have also, and more recently, arranged with Professors Walter Henson and Albert Worrell, both of the Yale School of Forestry, to propose in detail a study which one, or both of them, are prepared to undertake on the criteria which have been used in

reaching decision in various jurisdictions to undertake mass spraying programs against various pests, and to present a statement of the chemical, biological, economic and social factors which should be considered in arriving at such decisions in the future. They have also been asked to propose an optimum research program which should be financed and undertaken by both private and public agencies in connection with various types of spraying programs which may be commenced in the future.

Other specific studies will probably develop. In general, we continually try to keep informed as to what is going on in this whole complicated field of insect control. To make our programs useful and effective, we very definitely need the help and cooperation of people in the paper industry and we are desirous of establishing a close working association to this end.

Aerial spraying places a heavy responsibility upon its users. At the rate that the new and more powerful pesticides are being introduced by the chemical companies, it is almost impossible to know enough about their dangers to other forms of life and to conduct enough research to keep abreast of their application. We know a lot about DDT, but still not as much as we need to know—especially as to its long-time cumulative effect. The more powerful chemicals, such as Dioldrin and Neptachlor, have not been accompanied by sufficient research. Yet they have been used extensively in the fire ant program.

It seems to us that the pulp and paper industry—in fact every industry owning timberlands—should get behind an active research program, and at the same time should make every effort to keep the public informed of their problem in pest control and what they are doing about it. The public is usually critical of anything it does not understand.

Suggestions for the Industry

Following are a few suggestions as to what I believe industry can and should do. Many of you may already be doing these things, but some of you may not. One important point is that before any spraying program is conducted, the local populace should be given as full information as possible. The consent of those living on or owning lands in or near the fringe areas, should—whenever possible—be asked for.

It may be necessary to hold local meetings or hearings. The people of the area should be made fully aware of the reasons for spraying. This should include the general criteria for making the decisions to spray, and a frank explanation of the effect upon themselves, their jobs, etc. of spraying or not spraying. They should understand what possible unfavorable and unavoidable side-effects may occur and how long they may last, and why they are offset by what the spraying will accomplish.

During the spraying they should be kept abreast of the progress and understand some of the difficulties. They should later be informed of the results. This publicity must be simple and understandable. The public is not made up of foresters, or entomologists, or chemists, or economists. Loss of growth means to them only dead trees which they can see, and seldom includes an understanding of the economic value of annual growth loss of trees temporarily defoliated but which eventually recover.

In some cases they may see dead birds, fish, or even mammals. Their first thought is to blame these things on the spraying, and they may or may not be right—but they have no idea of when or if these populations will recover. These things should be made clear before spraying starts. An uninformed public is usually a hostile public, but by and large, if they are "in the know" you can with few exceptions gain their support—especially if it is evident that the spraying is necessary, is as limited and carefully conducted as possible, and that the net results will be to the community's benefit as well as that of the forest owners.

More Research Needed

Furthermore, we believe that the chemical companies themselves should devote more of their funds to research on the overall effects of their products and devise better and safer techniques of application. At the same time, however, the large users of these pesticides, such as those corporations owning timberland which may be subject to spraying, should also encourage and support more research whether that research is done by the corporation itself or through outside organizations. Many times the company itself can direct its research efforts in a way which is particularly applicable to its own areas and its own problems.

We need much more basic research about the insects themselves; we need to know more about the effect of the individual chemical on every form of life with which it may come in contact—both short and long-term effects; we need to know more about how long it takes for certain types of wildlife to recover to normal populations if the spraying has caused damage to them; we need to make every effort to reduce the necessity for chemical spraying, and this means more research into biological controls. Industrial forest landowners must assume their share of this responsibility.

You cannot, it seems to me, depend solely upon government research programs. In many of the things you need to know, they do not conduct research. The individual corporation has control over its own research and its own forest and has a field laboratory for experimentation. In many ways it can move faster and get results quicker than can be done through a governmental program. Funds that the timberland owners devote to carefully-planned and executed research and experimental programs will pay off in the long run.

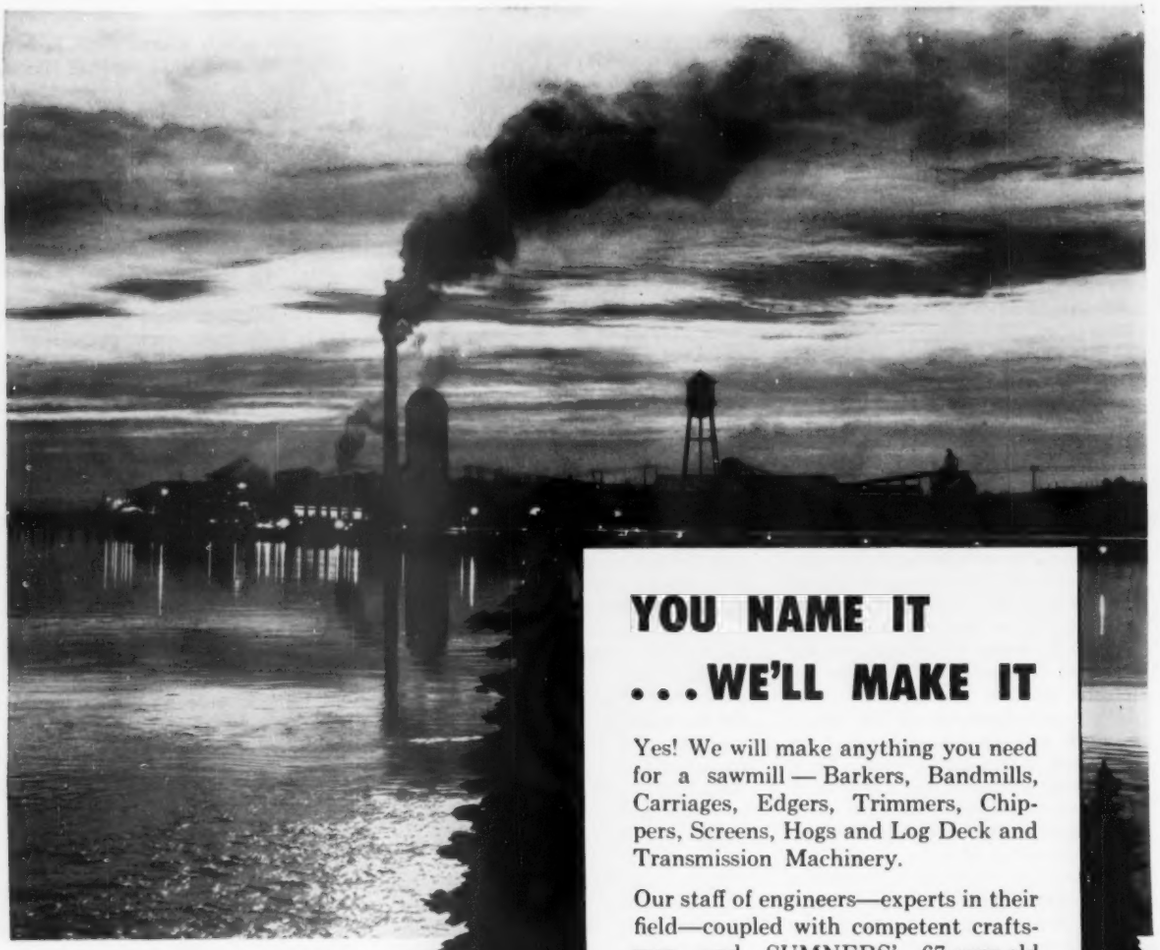
Need for Publicity

I cannot urge too strongly that these be undertaken. Such programs should be accompanied by good publicity. Let the public in general, and especially the local public, know what you are doing and the money you are spending to preserve the forest as a natural resource and to minimize the dangers to other forms of life including people. Use every medium at your disposal—news releases, advertising, and your TV commercials, etc.

One large timber-using company has been running a series of ads on its forest management practices and interesting ecological factors in the forests. One oil company is putting out a series of ads on conservation in general. You have all seen these ads. They do not advertise the product directly, but they are awfully good public relations. G-E has coined this phrase, "Progress is our most important product." Certainly your efforts to improve pest control and save the forests deserve public recognition.

In closing, I want to stress the fact that we at the Conservation Foundation intend to pursue our efforts to encourage the accumulation of more knowledge about every means of pest and disease control—through more research and better techniques of use, by narrowing the gap between existing knowledge and its application, and by better public understanding. We know that these are your aims as well.

We need to work together.



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ORGANIZATION AND PROGRAM FOR 1959-60

• The American Pulpwood Association will continue to strive for improvement to pulpwood preparation, loading, and production in general during the coming year. Its long-term objectives are:

(1) To conduct the Association in such a manner that it will guide and help the pulpwood industry to obtain pulpwood at the lowest cost, the highest quality and in adequate amounts now, and for future generations.

(2) To serve the entire pulpwood industry in our national programs which are Technical, Safety and Training, Statistics, Forest Management, and Legislative.

(3) To encourage all members to prepare now for the predicted increase in consumption of pulpwood to occur during the next 10 to 20 years.

Board of Directors

The work of the Association is carried out by the Staff along the lines and policies laid down by the Directors of the Association. These men were elected by the Industry Members of the Association at their Annual Meeting on February 24, 1959, in New York City.

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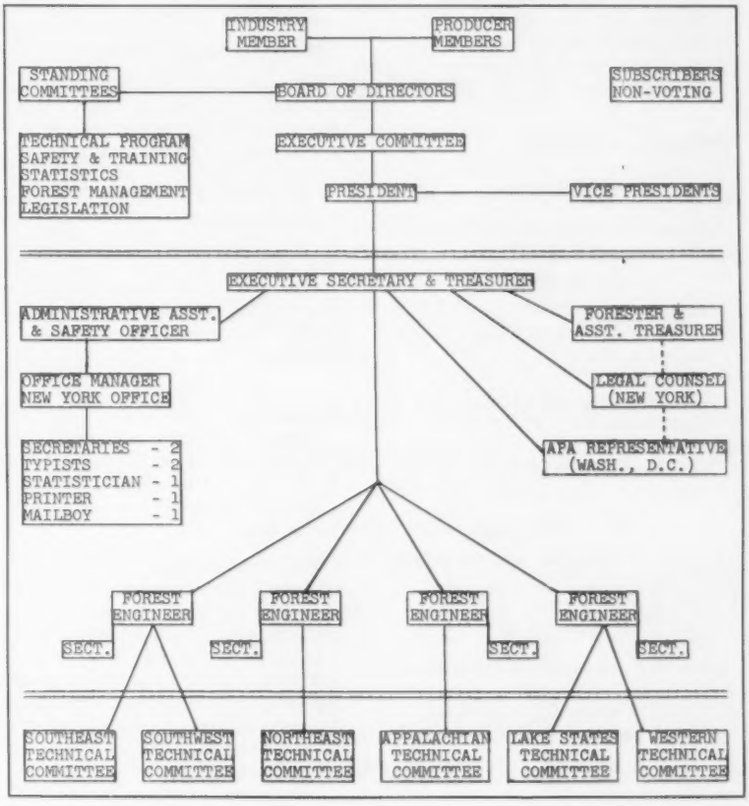

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Standing Committees

Standing Committees are set up to function as advisory groups who study the problems and recommend solution and courses of action to the Board of Directors, Officers, and Staff, in the APA program and respective fields of interest outlined for the responsibility of each Committee, in regard to matters affecting the Association in particular and the Industry in general. The Chairmen and Vice Chairmen of current Standing Committees are as follows:

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G. B. AMIDON, *Chairman*
Minnesota & Ontario Paper Co.
International Falls, Minn.

A. G. CURTIS, *Vice Chairman*
Gaylord Container Corp.
Bogalusa, Ala.

Between Meetings of the Board of Directors, the Executive Committee, consisting of nine members of and appointed by the Board, has and may exercise all of the powers of the Board of Directors subject only to the general approval and supervision of the Board. Its responsibilities include passing on its recommendations on all questions of policy and major decisions in reference to finance matters of the Association. This includes consideration of the annual budget of the Association, any questions in regard to assessments, and other financial matters, but a Budget Subcommittee may be set up each Fall to give special study to and report on this financial responsibility.

Technical Program Committee

S. K. HUDSON, *Chairman*
Container Corp. of America
Brewton, Ala.

W. M. MACCONNACHIE, *Vice Chairman*
Northwest Paper Co.
Cloquet, Minn.

Provides for the coordination of the activities of the Technical Committees of the Association when necessary. Includes the current Chairmen of the Technical Committees and such other members of the Association as are designated by the Board.

Provides source of advice with reference to any projects involving research into the production of pulpwood or closely related fields.

Provides advice to the Board and Officers of the Association in reference to any program, activities, or publications which are directed to the attention of pulpwood producers, pulpwood dealers, and others concerned with growing and harvesting pulpwood, or with general business relations between pulpwood producers and pulpwood consumers.

Safety and Training Committee

C. S. HERR, *Chairman*
Brown Company
Berlin, N.H.

C. E. MATHEWSON, *Vice Chairman*
St. Marys Kraft Corp.
St. Marys, Ga.

Coordinates and advises the Board and Officers in reference to the program and activities of the Association as it deals with training, safety, and supervision of manpower used in connection with the production and transportation of pulpwood.

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R. C. BARIENBROCK, *Chairman*
The Mead Corp.
Chillicothe, Ohio.

E. P. DAVIS, *Vice Chairman*
Rayonier Inc.
Fernandina Beach, Fla.

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Forest Management Committee

D. B. DEMERITT, *Chairman*
Eastern Fine Paper & Pulp Div.,
Standard Packaging Co.
Bangor, Me.

D. E. HESS, *Vice Chairman*
Glatfelter Pulp Wood Co.
Gettysburg, Pa.

Makes recommendations in regard to cooperating with and furnishing aid to government agencies and others in establishing policies and in carrying out practical measures of conservation of forest resources, especially as they affect growing and harvesting of pulpwood. Its responsibilities include reference to forest economic and forest taxation problems as they come to the attention of this Association.

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K. A. SWENNING, *Chairman*
Scott Paper Co.
Chester, Pa.
B. L. ORELL, *Vice Chairman*
Weyerhaeuser Timber Co.
Tacoma, Wash.

Makes recommendations in regard to such actions and proceedings as may be authorized by the Members of the Association, or its Board, with reference to any and all existing or proposed legislation and regulations and interpreting the same which may affect or be applicable to the pulpwood industry or any part thereof.

Technical Committees

The six regional Technical Committees are made up of representatives of members operating within the region concerned. Lists of the personnel of these Committees are provided only to Assocation members. The current Chairmen and Vice Chairmen are:

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Filer City, Mich.
F. N. FIXMER, *Vice Chairman*
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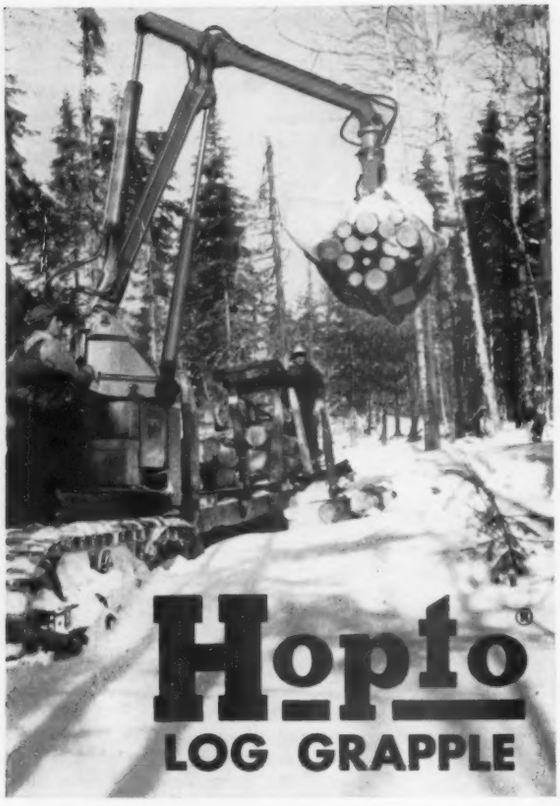
Any individual or organization interested in receiving American Pulpwood Assocation publications can do so either through membership or subscriptions. Membership is confined to bona fide producers, dealers, and consumers of pulpwood in the United States.

Subscriptions to American Pulpwood Association material are available to those who do not qualify for membership; e.g., producers, dealers, or consumers of pulpwood outside the United States, those engaged in other forest products industries, equipment manufacturers or dealers, public foresters, forestry students, etc.

Details as to cost of membership and subscriptions are available from the Association's Office at 220 East 42nd St., New York 17, New York.



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REVIEW OF ASSOCIATION ACTIVITIES

● Looking back on 1958 we can take heart from the fact that we have weathered it so well. We have succeeded in planting our feet more firmly and in improving our methods of forest management and procurement. Perhaps even more important to us in the long run, we have been forced to devise more ways of controlling the cost of wood.

Pulpwood consumption in 1958 was down slightly from the previous year, by about 1%. You have all been aware of the surplus supply of pulpwood which has plagued the industry and added to our pulpwood procurement problems this past year. Even worse, it has created problems for our producers and dealers who have had to balance out their business with a surplus of pulpwood on one hand and rising labor and equipment costs on the other. This hasn't been a problem with which the Association could help directly, but for all of us this has increased our burdens in keeping relationships with our producers and dealers on a good level.

There are a few significant trends in pulpwood consumption which indicate the way our industry is presently going. Consumption of all chips, slabs and other wood waste increased abut 18% over the year previous. The growth in the receipts of this material increased consistently throughout the country, but was most marked in the South Atlantic and South Central regions. In the West, it now constitutes about half of the total receipts for 1958. This trend is likely to continue, although within a few years we may reach a saturation point on use of mill leftovers.

The overall use of hardwoods increased only about 1% in 1958 but nevertheless reached the impressive figure of 6,403,000 cords. Indications are that use of these woods will continue to increase. They are in good supply and can be expected in large measure to help meet tremendous future demands.

Every measure of forest management practices of the pulp and paper industry in the past has shown us to be in the forefront of progress in growing an adequate supply of raw material. The long awaited Timber Resource Review Report shows that our industry employs more professional foresters, manages more tree farms, conducts more extension forestry programs to help other landowners, and expends more per acre on forest management practices than any other group.

The future stability and profits of our companies will not only be dominated by the degree to which we are capable of applying our technical skills, but also by the degree to which we are successful in bringing about a healthy economic and legislative climate in which our industry can prosper. These may well prove to be the toughest problems we will face this year and, perhaps, for many years to come.

The membership and finances of the Association remained relatively stable during 1958. A recent survey indicates that industry membership covers over 80% of all pulpwood consumed in the United States. Our producer membership is growing steadily and, with added effort, could show an even greater increase. APA continues to be in a healthy financial position, adequately strong to provide the services needed to accomplish our objectives.

The loss of two key employees in the New York Office has hampered administrative activities to some degree. This situation will be remedied after a period of adjustment and training.

The activities of our standing committees in guiding our five main programs during 1958 are covered separately.

Technical Program

The Technical Program of the Association has continued its ten-year record of steady growth. New programs for seeking out and perfecting better and cheaper ways to grow, harvest, and utilize pulpwood have been tackled with vigor and enthusiasm. Certainly 1958 saw member interest at an all-time high. Much of this is attributable to the fine work carried on by Technical Committee chairmen.

The APA Technical Program covers three major areas of activity: (1) Regional Technical Committee meetings; (2) Special action projects, usually of a technical nature, designed to help solve current production problems; and (3) Publishing of Technical Releases. Our Forest Engineers devote a large share of their time to this program.

It is significant that efforts to organize a Western Technical Committee have been successful. The addition of this group of foresters and men in pulpwood production now makes possible a free flow of valuable technical ideas and information between all six major pulpwood producing regions in this country. In the past, an otherwise well-knit organizational struction was without Western representation. The growing interest, close cooperation, and show of enthusiasm by many of our Western members did much to help get this Committee underway.

A review of key subjects selected for coverage at each meeting of the Technical Committees reveals 1958 regional problems and areas of interest. They are as follows:

Lake States

May—Planting—Machines, Techniques, and Procedures.

September—(1) Pulpwood Transportation Break-Even—Truck vs. Rail. (2) Purchasing Pulpwood by Weight.

Applachian

May—Increasing the Cooperation between the Pulpwood Industry and the Managers of our Public Lands.

October—Pulpwood Procurement in the Appalachian Region.

Southeast

April—Research and Development in Pulpwood Production.

November—Exploring Cheaper and Faster Ways to Produce Pulpwood.

Southwest

April—Workmen's Compensation Costs and Woods Safety.

November—Pulpwood Production and Changing Times.

Northeast

January—Scaling Pulpwood by Weight.

October—Problems of the Independent Producer All Day Field Trip.

West

December—Pulpwood Chips—Production, Measurement and Handling.

An index of the papers presented at the above meetings is available to APA members from the New York Office.

Technical Committee groups with problems requiring active corrective measures undertook the job by forming temporary action committees, special projects, and reorganizing Technical Review Subcommittees. The following work of this nature was carried out:

Southeastern: A temporary chip committee was appointed to help traffic managers in their drafting of a

suitable proposal covering weight and volumetric measurement of chips for freight rate settlement. This same Committee expressed opposition to the conversion of pulpwood rack cars into chip cars by the Southern Railroad.

Several active members of the Industrial Forestry Subcommittee were given authority to work with the Southeastern Experiment Station in the publishing of a pamphlet to quiet the fears of landowners regarding beetle infestation when cutting is done in summer months.

A Subcommittee on Exploratory Research was organized in this region. Its members will systematically seek out new ideas for more efficient production of pulpwood and its closer utilization.

Lake States: This group put into effect the APA Safety Flyer program. This is, essentially, a program for attaching a humorous safety note to each weekly paycheck mailed to pulpwood producers by the companies.

Applachian: In this region work was done to bring about close cooperation between companies and public agencies on timber sales.

Northeast: This committee also started an APA Safety Flyer program during 1958. In addition a Producers Subcommittee was organized to work with independent pulpwood producers

Concerning research and technical projects on a national level, copies of the completed APA Manpower and Equipment Survey were distributed to APA agents and alternates.

Safety and Training Program

In 1958 we tried to emphasize the continuing importance of training men to work safely in the woods as well as the increasing importance of improving the safety records of our own industry—pulpwood logging.

During this period of increased costs and narrowed profit margins, attention became focused on increasing insurance costs and rising claims. Recognizing these facts and feeling that a direct approach was the only possible solution, a series of paycheck insert safety flyers was developed both in the Northeast and in the Lake States regions. Humorous in nature yet carefully tied in with the primary causes of accidents in each region, they were aimed at promoting safety with the man in the woods.

A continuing interest on the part of some of the technical committees in the field of Workmen's Compensation Insurance led APA to consider the feasibility of possible insurance coordination through the Association itself. This possibility was presented to the Directors who in turn have authorized the Secretary to explore these fields.

Currently several members of the various regional safety subcommittees are cooperating and assisting in the preparation of the pulpwood logging section of a safety manual being prepared by the Pulp and Paper Section of the National Safety Council.

The formation of a producer subcommittee in the Northeast now affords an excellent opportunity to further a safety and training program, particularly for our producer members. We are optimistic that this relationship will, in turn, help us to place greater emphasis on our safety and training program.

A poll is currently being made of all members to determine the effectiveness of the Association's Training Guides and Worker Handbooks. Essentially we are endeavoring to determine whether to continue this phase of our safety work or to channel our efforts toward other safety and training programs.

Poor accident records, increasing costs of accidents and mounting compensation render it obvious, indeed imperative, that we continue our efforts to initiate and further develop an effective, useful and workable safety program in our industry.

APA TECHNICAL RELEASES ISSUED DURING 1958

No.	*Subject*
328	Harrison-Brown Pulpwood Harvester.
329	A New Design in Steel Banding for Bundling Pulpwood.
330	Brady Tree Girdler.
331	Chip Storage in Outside Piles.
332	Forest Management Records.
R-1	Harrison-Brown Pulpwood Harvester.
R-2	A New Design in Steel Banding for Bundling Pulpwood.
R-3	Brady Tree Girdler.
R-4	Chip Storage in Outside Piles.
R-5	Forest Management Records.
R-6	"Recommended Management Practices for Forest Land in Southeastern Ohio."
R-7	Pulpwood Cart.
R-8	Bullard Mechanical Back-up Safety Alarm.
R-9	"Porcupine" for Tearing Down Pulpwood Stacks.
R-10	Live Trailer Bed for Unloading Chips.
R-11	Application of Airphoto Techniques in Planning Logging Road Networks.
R-12	Retaining Net for Open Rack Cars.
R-13	Powered Pulpwood Trailer—Supplement.
R-14	School for Woods Cooks.
R-15	Morbark Portable Debarker.
R-16	Hosmer Debarker—Model L-20 Series.
R-17	Outline for Technical Releases.
R-18	A Successful Small Operator in Southern Maine.
R-19	S. D. Warren Company's Mechanized Operation Ten-Years of Progress.
R-20	"Minnesota's Tree Growth Tax Law."
R-21	Pulp Company Land Ownership Objectives.
R-22	The Pioneer Large Scale Tree Farm of the Northeast.
R-23	Pulpwood Exhibit—1958 Woodsmen's Carnival.
R-24	Status of Timber Trespass on Pulp and Paper Company Lands.
R-25	Wright Super Rebel Power Saw.
R-26	Outside Storage of Pine Chips (Progress Report #1).
R-27	Debarking and Chipping Pine Thinnings (Progress Report #1).
R-28	"FWD Blue Ox Skidder."
R-29	"Rootspred Lake States Model Tree Planter."
R-30	"Prentice Trailer Mounted Hydraulic Loader."
R-31	Concora Furrow Seeder.
R-32	Wheeled Tractor with Loader and Cart.
R-33	"Stumpage Appraisal Procedures and Policies of U. S. Forest Service."
R-34	Communications (Public Relations).
R-35	Remote Trip for Standard Log Tongs.
R-36	Combination Chain and Cable Log Binder Assembly.
R-37	Morbark Portable Debarker.
R-38	Pulpwood or Sawlogs.
R-39	Woodlands Safety Bulletin.
R-40	Public Relations.
R-41	Jeep Mounted 150-Gallon Brush Control Sprayer.
R-42	Harrison Pulpwood Harvester.

Industrial Forestry Program

The year 1958 may go down in the annals of forestry history as the year when more studies were conducted and reports made, and more meetings and conferences held on more forestry subjects and problems, than any other year in our history.

Studies and Reports

The most important and far reaching report issued in 1958 was the Timber Resource Review. Few of the recommendations we had made were incorporated in the final draft. The TRR was the subject of considerable controversy resulting from the publicity that accompanied it. An article in a national magazine which was somewhat unfavorable to the industry viewpoint stirred the controversy. A subsequent article by the same magazine presented the industry viewpoint. A study of the TRR was prepared for the Forest Industries Council by Dr. Lee M. James, professor of forestry at Michigan State University.

Perhaps the second most important study made last year was the "Study of the Cooperative Forest-Fire Control Problem" by Battelle Memorial Institute. This report is important because it would recommend a trend away from private and state agencies assuming more and more responsibility for total fire control. APA's Board has considered this report very carefully, but has decided not to act on it at this time.

Dr. Weintraub, professor of Economics of the University of Pennsylvania, was retained by the Forest Service to study the Forest Service stumpage prices and appraisal methods. His report is also considered an advisory report by the Forest Service which is presently studying it carefully. The report is highly technical.

Dr. Lee M. James presented two reports for APA and FIC respectively. They were of considerable importance and received wide distribution in 1958. His first, prepared for APA, was based on a thorough and comprehensive study of "Property and Yield Taxes on Forests." The second report completed for the FIC concerned his study on "Small Forest Land Holdings." This report emphasizes that attention needs to be focused on methods of organizing smaller holdings into larger units for more effective management.

Meetings and Conferences in 1958

Perhaps the most important and far-reaching of our meetings held during 1958 were the numerous Small Woodland Conferences sponsored by the Forest Service. The Forest Industries Council and APA adopted a statement of policy relating to small forest ownerships which was presented at a number of their regional meetings.

The Forest Industries Council also issued summary reports for each of these meetings. The reports were circulated among the entire forest products industry and received many favorable comments.

The Forest Service is presently studying reports of regional foresters to determine what should be done in 1959 as a follow-up program to the 1958 Conferences.

Another meeting of considerable interest was APA's Forest Tax Symposium following the Board of Directors meeting in Chicago. It was here that Dr. James made his report which was mentioned previously. The purpose of this symposium was to educate our own members on various features of the income tax laws as they affect the pulpwood industry.

The Forest Industries Pest Committee, appointed by the Forest Industries Council, began to function in 1958. This committee, representing the industry in all regions of the country, will function as a coordinating agency for pest control matters of national importance. It will represent the forest industries in cooperating with the federal government and state foresters in forest pest matters.

Much has been accomplished during the year toward establishing favorable attitudes with those whose opinions and activities affect our industry. The FIC, representing APA, APPA and NLMA has been responsible for much of this coordination between various conservation organizations, federal agencies, etc. It is difficult to evaluate completely the accomplishments to date, however, we are encouraged by recent developments.

Statistics Program

Progress has been made in improving our statistical program and broadening the coverage. Participation in our monthly and quarterly pulpwood reports had increased from 187 mills to 193 mills. Southern mills reporting statistics in our Weekly Pulpwood Summary have increased during the past year from 48 mills to 58 mills, adding the state of Maryland to the other Southern states already reporting.

In May 1958 our first annual summary, the PULPWOOD STATISTICAL REVIEW, was compiled, published and distributed to members, subscribers, and all reporting companies. This REVIEW included pulpwood statistics from 1899 through 1957. The 1957 figures included a summary of our monthly and quarterly pulpwood reports. Supplementary data to this report for the year 1958 is being compiled.

A uniform procedure was adopted for determining inventories. To facilitate this, definitions were made of pulpwood statistical terms and all companies reporting pulpwood statistics to APA have been informed of these definitions and procedures. In addition, the Bureau of Census has been advised of these definitions and in order to encourage uniformity in reporting pulpwood statistics they are presently reviewing them for possible future use.

Legislative Program

The 85th Congress was followed by a rash of public hearings on many subjects all over the country. Congress wound up taking final action on many measures on which APA had taken an active stand, with the concurrence of our Legislative Committee or Board of Directors.

The most important thing to us that the 85th Congress did *not* do was to touch our 12-man or seasonal exemptions under the Fair Labor Standards Act. Following most successful presentations of our views by pulpwood producers in New Orleans and Washington the year previous, Congress rightly decided that our exemptions were reasonable and left them alone despite concerted effort to remove many other exemptions. We did not gain any ground as far as clarifying the definition of "employe" is concerned.

One legislative story with a happy ending was getting the Coordination Act modified so as not to seriously interfere with timber sales. This was accomplished without affecting the wildlife conservation objectives of the bill and was brought about by the Departments of Interior, Agriculture and the Army Engineers agreeing to compromise.

At the last minute, and without either hearings or debate, an amendment was added to the Small Business Act of 1958, providing that a "fair" proportion of the total sales of government-owned timber be set aside for small business concerns. In December the SBA published a proposed definition of small business as one independently owned and operated, not dominant in its field, and one which employs 250 or fewer persons. Both the Interior Department and Agriculture Department have cooperated with the SBA to develop regulations to make this provision operative.

Legislation to establish a National

Wilderness Reservation System has received a great deal of attention by APA, because the effects of this legislation can reach far beyond the mere establishment of a wilderness system. We submitted statements before the Senate and House Interior and Insular Affairs Committees in Washington. The Senate Committee held hearings in Bend, Ore., San Francisco, Salt Lake City, and Albuquerque. Mr. L. J. Forrest of Rayonier Inc. presented testimony on behalf of the Western members of APA at San Francisco.

Our argument that wilderness legislation should wait on the report of the Outdoor Recreation Commission is gaining headway with a lot of people, including Congressmen.

The 85th Congress passed the National Outdoor Recreation Resources Review Commission. Although APA supported this measure, our greatest triumph was achieved through successful efforts to get able representatives appointed to the Commission.

APA supported the conservation organizations in getting a pesticides study bill passed, although we asked that it be a much bigger and more effective project than was proposed and passed by Congress.

We suffered a serious set-back in failing to get funds deleted from the appropriations bill for 1958 for the construction of the McGee Bend Dam on the Angelina River. The dam will unnecessarily innundate 60,000 acres of timberland, more than would be required with a smaller flood prevention dam.

Senator Proxmire of Wisconsin has been an ardent proponent of a pilot plant to refine the technique for the manufacture of newsprint from low grade hardwoods. APA prepared several statements during the year which refuted the need for such a plant. It is highly unlikely that this is a dead issue, as long as Senator Proxmire maintains a personal interest and keeps it alive by articles in magazines and plugs at hearings of the Senate.

The Senate Small Business Committee held a hearing on the problems of independent loggers and sawmillers in Superior, Wis., and a second hearing in Washington. There may be more. Both hearings already held turned out to be probing affairs obviously intended to generate support for things which the members of the Committee wanted—price reporting, pilot newsprint plant, tax concessions, easier credit, and others. Some would be genuinely helpful to the pulpwood producer, others obviously would only bring unwarranted federal intervention and red tape.

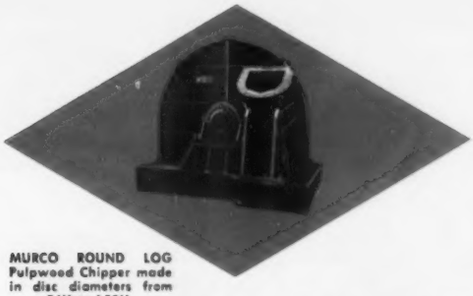
1959 PULPWOOD ANNUAL—ADVERTISERS INDEX

MURCO 102", 10-knife Pulpwood Chipper installed at East Texas Pulp and Paper Co., Evadale, Texas.

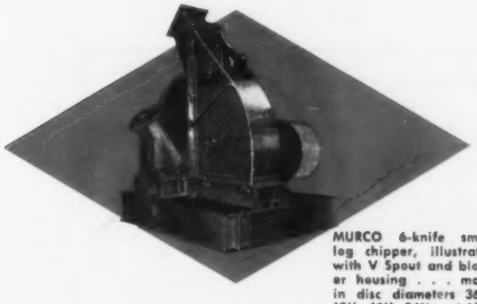
MURCO 90" Left-hand 10-knife chipper installed at Rome Kraft Mill, Rome, Georgia.

MURCO

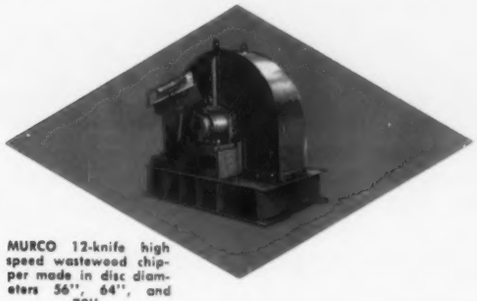
Pulpwood Chippers



MURCO ROUND LOG Pulpwood Chipper made in disc diameters from 54" to 153".



MURCO 6-knife small log chipper, illustrated with V Spout and blower housing . . . made in disc diameters 36", 42", 48", 54" and 60".



MURCO 12-knife high speed wastewood chipper made in disc diameters 56", 64", and 72".

DESIGNED TO PRODUCE MORE AND BETTER CHIPS AT LESS COST

Incorporating the most desirable features for today's production requirements, MURCO Pulpwood Chippers are the result of long and careful study of the various factors that contribute to outstanding chipper performance in producing more and better chips at less cost, less sawdust, fewer slivers, free from repairs, yet at the same time having production records of 100 cords or more per hour. MURCO heavy design construction reduces vibration . . . is compact and requires less floor space. MURCO Round Log Pulpwood Chippers are designed for use where production is high, where maintenance must be held to a minimum and quality chips are a "must". Made in disc diameters from 54" to 153". Other pulpwood chippers are made in sizes 36", 42", 48", 54" and 60" . . . designed along the general lines of the Round Log Chippers are MURCO 12-knife high speed wastewood chippers made in disc diameters 56", 64" and 72", and MURCO mechanical feed 4-knife wastewood chipper with 75" disc diameter . . . all backed by years of constant development so that each year results in an improved chipper design, the latest of which is MURCO UNI-CHIP.

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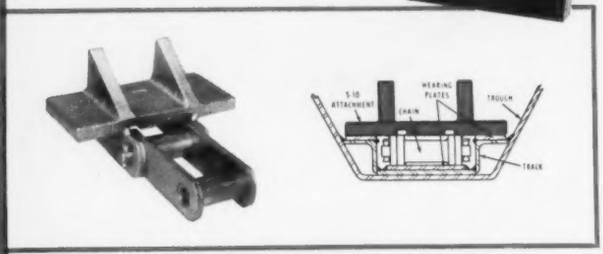
Consult new Link-Belt Catalog 1050 for full details. Call for a copy from your Link-Belt office or authorized stock-carrying distributor, listed under CHAINS in the yellow pages of your Phone Directory.



SHOCK ABSORBER. S-10 attachment for SS-150+ chain has broad sliding surfaces that contribute to long wear-life of both track and chain. Impacts are absorbed by track, not chain joint.

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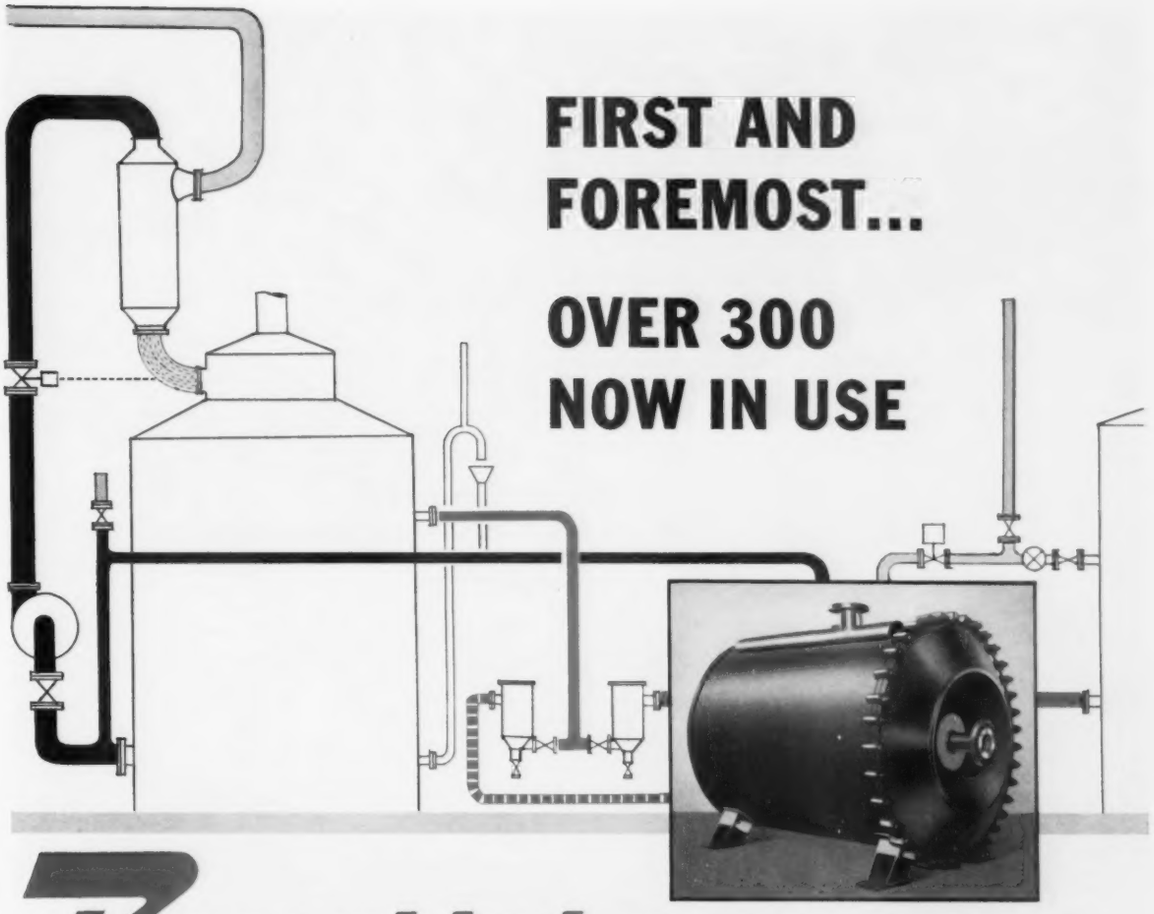

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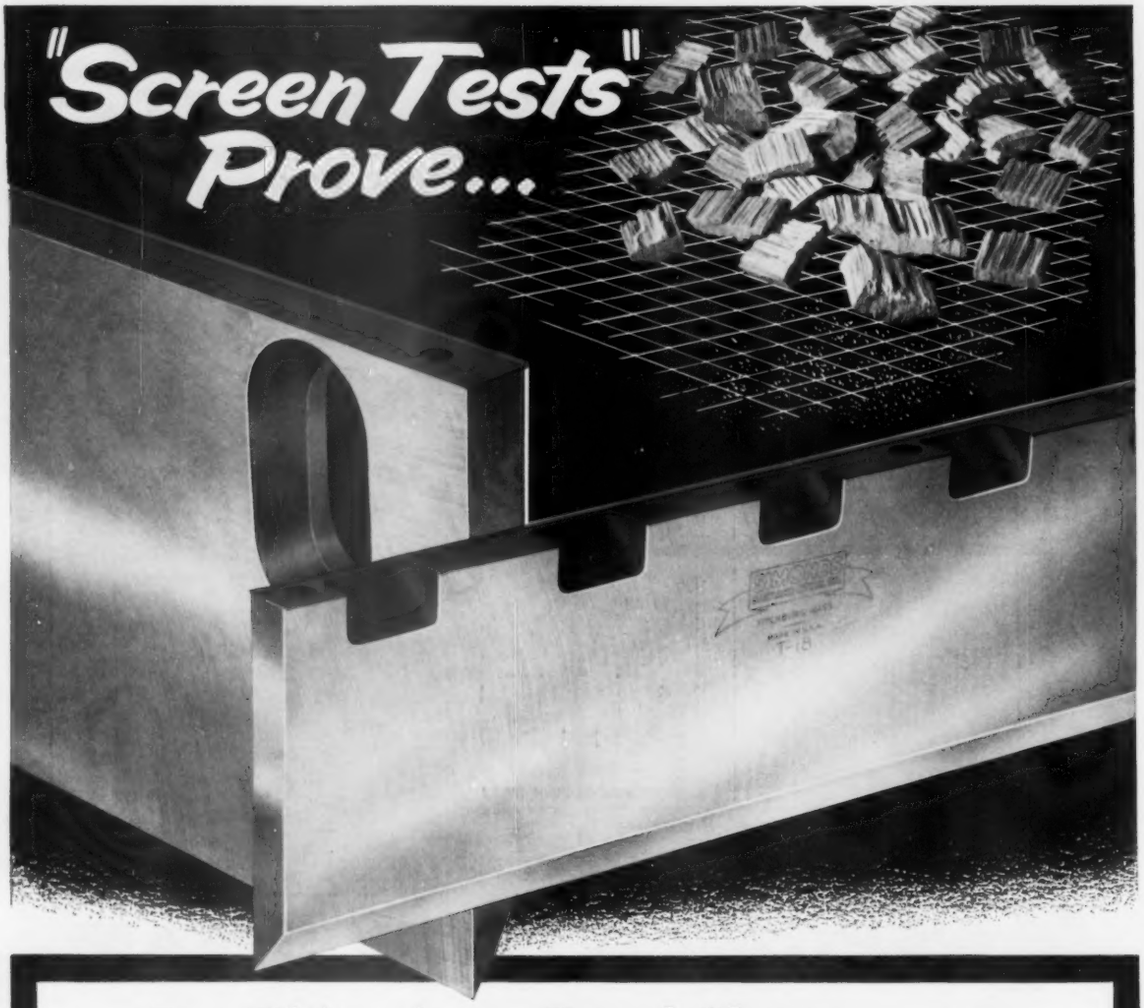

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You get this with Simonds T-18 Steel Knives because they are extra tough, take high speeds and heavy cuts, have extra resistance to dulling which causes bruised chips and excess dust.

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This Super-Seal motor with *Poxeal* insulation and protected bearing was not fouled by mud. An Allis-Chalmers customer, in a frequently flooded area, required a motor that could readily start even after prolonged immersion in mud.

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Big, new 16" plunge-cut bow makes your job easier . . . eliminates stooping, gives you a pinchless cut. Its famous Homelite engine delivers plenty of lugging power for day in and day out cutting . . . the kind of power that whizzes through 18" trees in 16 seconds.

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Straight blades from 14" to 28" let you fell trees up to five feet in diameter. Also available with a clearing bar.

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Of course, it all depends on your set-up. You may make profitable discoveries by discussing it with one of our representatives. He will then work with the Paper Section of our Technical Service to determine how they can help you increase your pulp brightness in the most economical way suited to your operations. For example, many firms have found that they could add a hydrogen peroxide bleaching step and eliminate another operation, thereby increasing pulp brightness without increasing cost.

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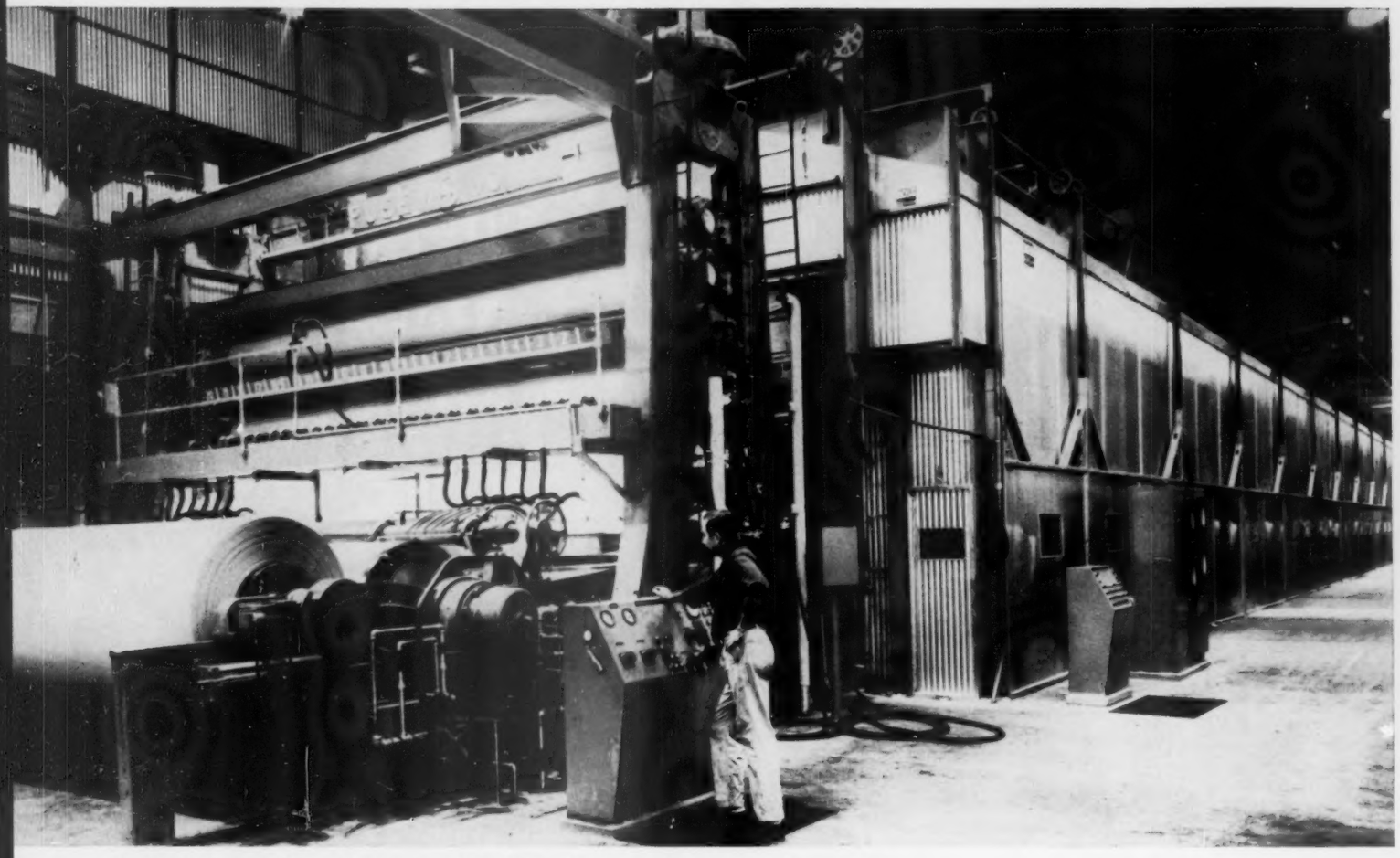
Southland Paper



Designed for newsprint production at 2500 FPM, Southland's new No. 4 paper machine was built by Pusey and Jones Corporation, powered by a General Electric multiple-generator sectional drive. The new machine, 270 inches in width, uses 14 G-E drive motors totalling more than 3000 horsepower.

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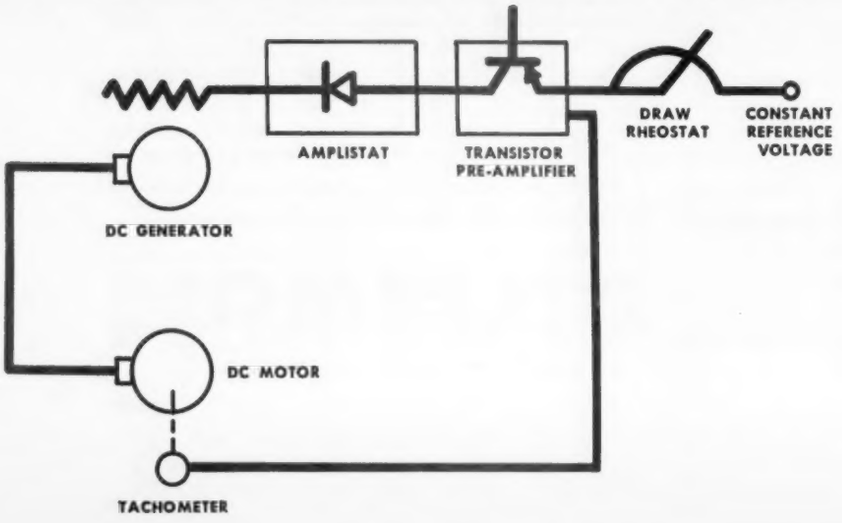
How the G-E Multiple-Generator System Works . . .



Each section motor operates on generator voltage control. The motor speed is measured by a tachometer, whose output voltage is compared with the over-all machine's constant reference voltage. With even the slightest difference between the two voltages, the transistorized pre-amplifier responds instantly through an amplistat regulator to change the generator voltage, maintaining the exact desired motor speed.

specified General Electric Drive featuring new transistor amplistat

HERE'S WHY . . . •Improves machine availability
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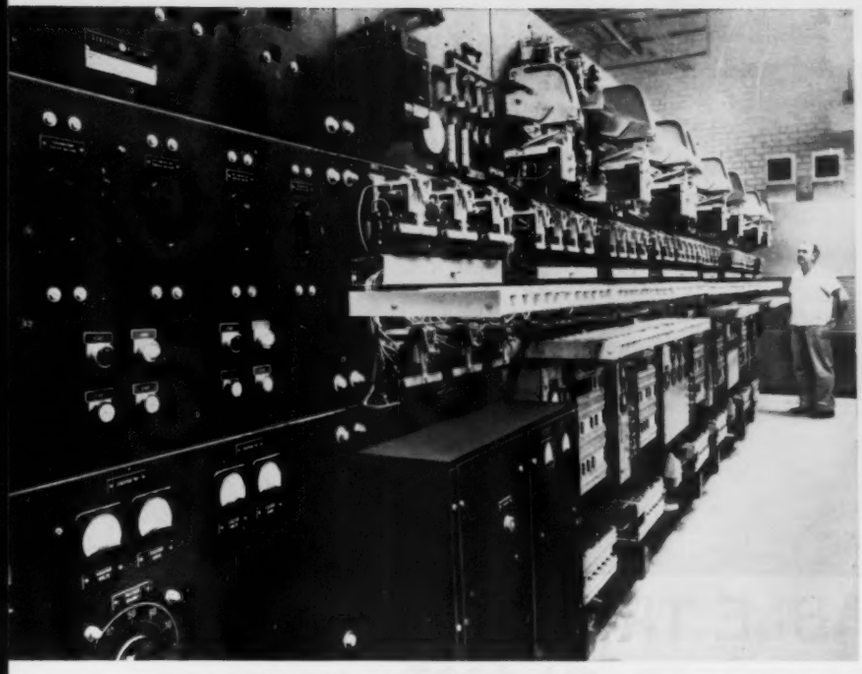
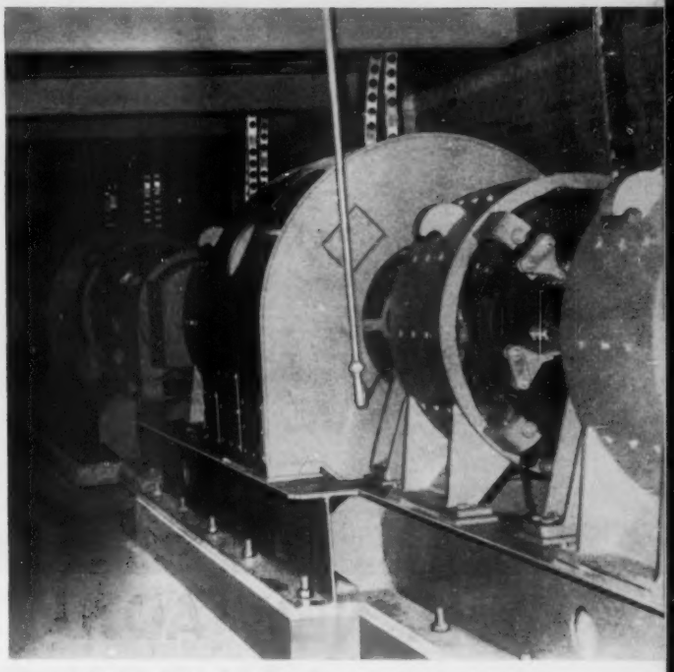
•Reduces electrical maintenance



General Electric static speed regulator provides high accuracy, fast response control. Amplistat power amplifier and completely sealed transistor pre-amplifier give long-life, trouble-free operation and reduce costly unscheduled downtime.



Dependable power is supplied by two G-E MG sets, each driven by a 1500 hp synchronous motor. Separate generator for each section adds flexibility, simplifies operation and maintenance.

FOR ALL PAPER MAKING APPLICATIONS

Southland Paper Mills' new No. 4 paper machine at their Lufkin, Texas mill, powered by a General Electric multiple-generator sectional drive, presents a major advance in drive systems for the paper industry.

New technology, such as use of transistors and magnetic amplifiers in the G-E static speed control, provides trouble-free, reliable operation to increase machine availability and reduce maintenance time and expense. Result: *greater output.*

Co-ordination of the equipment into a flexible, easy-to-expand electrical system resulted from close co-operation between Southland engineers and General Electric application and service engineers.

General Electric engineering services also can help you design, equip and install a well-integrated electrical system suited to your specific needs. For more information on paper-mill drives, call your nearest General Electric Apparatus Sales Office or write to General Electric Co., Section 655–23, Schenectady 5, N. Y.

SYSTEM ENGINEERED DRIVES FOR PAPER INDUSTRY

GENERAL ELECTRIC

THE MOST IMPORTANT NEW ADVANCE IN PAPER CUTTERS SINCE ELECTRONIC SPACING AND HYDRAULIC CLAMPING

THE NEW ADJUSTABLE TRULY FLEXIBLE LAWSON CONTOUR CLAMP

Hydraulics plus air assures uniform clamping pressure regardless of surface irregularities.

The new Lawson Adjustable Truly Flexible Contour Clamp flexes to conform to the irregularities in the surface of the lift. It gives full, uniform clamping pressure all the way across the work being cut. The result is unmatched cutting accuracy and production.

You do not need to pad the clamp or reduce the height of the lift to avoid inaccurate cutting of "difficult" papers. Lawson uses hydraulics plus air to give you a truly flexible clamp that is really adjustable.

Standard equipment on all Lawson 60", 66" and 69" Pacemaker Mill Cutters, optional on all other Lawson Hydraulic Clamp Cutters. Write today for full details.

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PULP & PAPER

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Pulpwood

St. Regis Paper Co. has announced that ROBERT DELONG has been appointed asst. to PAUL M. DUNN, director of forestry, and will serve as liaison and coordinator of federal, state and private forestry activities in the Pacific Northwest. Mr. DeLong has been with St. Regis in the Northwest since 1944 and has been asst. gen. mgr. of logging and asst. to the logging mgr. He continues to headquarter at Tacoma, Wash. . . . LLOYD C. RODGERS, logging mgr. for Powell River Co. Ltd., has retired from active duty. He will continue as an advisor on wood procurement on special assignment by JOHN E. LIERSCH, exec. vice pres. He has been in the industry since joining Capilano Timber Co. in 1917.

Crown Zellerbach Corp. has announced the promotion of woods personnel: D. Y. DAVIS, former resident engineer at the Clatsop div., becomes asst. logging supt. of the Seaside operation; C. L. WOOD, Clatsop div. forester, becomes resident forest engineer; M. A. MOSAR, Clatsop resident forester, is named asst. supt. of the Southwest Washington Logging div.; D. L. BURDICK, is promoted from Clatsop resident engineer to resident forest engineer, and W. S. HICKS, Clatsop forest fire warden, becomes asst. resident forest engineer. . . . FLOYD L. MORAVETS, chief of forest economics research at the Pacific Northwest Forest & Range Experiment Station in Portland, Ore., has retired after completing 34 years of forest research and administration. . . . JUSTIN G. SMITH, range conservationist, has been named leader of the Mid-Columbia Research Center, Wenatchee, Wash., with responsibility for development and direction of U.S.F.S. research activities over the central part of the state.

Midwest

RICHARD L. SIEGEL, president of the Gardner Div. of Diamond Gardner Corp., has been elected to the national board of directors of the Folding Paper Box Assn. Mr. Siegel joined Gardner in 1949 as director of industrial and public relations. He became vice pres. in 1954 and later that same year was named asst. to the vice pres. and gen. mgr. In 1957 he was appointed vice pres. and gen. mgr. of the Gardner Div. and was promoted to the division presidency in November 1958. . . . JAMES F. PORTER has been named chief engineer for Chase Bag Co. He was formerly manager of the firm's manufacturing plant in Toledo, O., and will be succeeded in that position by JAMES E. TOWN JR. Mr. Porter will make his headquarters in the company's main offices in New York, N. Y. . . . JACK R. HALLER has been appointed chief engineer of D. J. Murray Mfg. Co., Wausau, Wis. He joined Murray in 1957 as a design engineer.

J. J. HALLOWELL, 68, president of Wrenn Paper Co., died recently at Cincinnati. He had been associated with Wrenn Paper of Middletown, O., for more than 50 years. In 1946 he was elected president, after holding offices as secretary, treasurer and vice pres. . . . RONALD W. ANDERSON has been named plant engineer and DON H. JOHNSON personnel manager of Appleton Woolen Mills, Appleton, Wis. Both men were previously employed by Ansul Chemical Co., Marinette, Wis. Mr. Anderson was a product engineer, while Mr. Johnson was office service manager.

The election of J. N. ANDREWS, exec. vice pres. of Ohio Boxboard Co., Rittman, O., as president of the Folding Paper Box Assn. of America was announced recently at the final session of the group's annual meeting in Chicago. Mr. Andrews, who joined Ohio Boxboard in 1936, became gen. sales mgr. in 1948 and was elected exec. vice pres. in 1956. He has served on the FPBAA board of directors since 1948 and has been a member of the executive committee five years.

A. E. Staley Mfg. Co. of Decatur, Ill., has formed a new process service section in the Manufacturing div. Named to head the new section as mgr. of process service is EDWARD B. FREYFOGLE, promoted from the position of syrup refinery

Bon Voyage—Editor and Mrs. Wilson Tour Europe

ALBERT W. WILSON, editor PULP & PAPER and PULP & PAPER INTERNATIONAL, and MRS. (JESSIE) WILSON are now on a three-month visit to pulp and paper mills in Europe. No stranger to the European scene, Mr. Wilson spent 10 years as correspondent for the Associated Press in Europe prior to World War II.

During his trip Mr. Wilson will visit virtually every papermaking country in Europe (including Soviet Russia), visiting mills and making contact with many of the more than 40 international correspondents of PULP & PAPER.

A veteran observer of the North American industry for almost 20 years, Mr. Wilson will report firsthand on his visits to European mills during his trips.

After their arrival in Paris (via Pan American jet) on Easter Sunday, the Wilsons were greeted in Paris by Burke Morden (Morden Machines).

LOGGERS, TOO, HEAR OF QUALITY CONTROL—Crown Zellerbach Canada woods personnel from outlying camps learn of CZ products, operations and problems during annual session at Vancouver, B.C. headquarters. GORDON A. NAYLOR, log. supt. at Sandspit, Queen Charlotte Is., displays wet-strength household towels to (l. to r.) HUGH HODGINS, vice pres.-timber, TONY TURNER, asst. engr. of Comax Logging Div., DAN KULAI, log. foreman of Saltery Bay operations at Jervis Inlet; GEORGE PEARSON, log buyer, Elk Falls Co.; NORMAN PELTON, engr. at Bella Coola.

supt. The new section is part of the process engineering dept., headed by G. James Dustin, technical supt. . . . William O'Gara has been appointed asst. production of the Wisconsin Rapids div. of Consolidated Water Power & Paper Co., Wisconsin Rapids, Wis. He has been serving as supercalender and winder supt. since 1945 and joined the company in 1942. George Jackson has been named to succeed Mr. O'Gara. . . . Richard S. Moyer of Minneapolis has been appointed asst. to Richard E. Whinrey, vice pres. in Indianapolis for Link-Belt Co. Mr. Moyer has been gen. mgr. of the company's North Central div. with headquarters in Minneapolis and is to be succeeded by his assistant, George Ramsden.

Charles F. Chaplin has joined Perkins-Goodwin Co. as Midwest director of sales research. He will represent the company from its Chicago office. . . . Ralph B. Quelos has been named gen. sales mgr. for the division, and James C. Rankin becomes sales mgr. of national accounts, according to an announcement by the Chemicals-Pigments-Metals div. of Glidden Co. Mr. Quelos is a veteran of 25 years with Glidden and since 1955 has served as eastern sales mgr. for the division. Mr. Rankin joined Glidden in 1942 and has served the division as central sales mgr. since 1955.

Edwin J. Brophy has retired after 46 years of service with Ohio Boxboard Co. He had been in the paperboard industry a half century. At Boxboard, Mr. Brophy held positions in purchasing, manufacturing and sales, and in 1937 he was named board sales mgr., a position he filled until he was recently succeeded by W. S. Young. Mr. Brophy was honored at a dinner given at the Portage Country Club in Akron, O., recently. . . . Chain Belt Co. of Milwaukee has announced three executive appointments: Robert

Sigvardt Named Manufacturing Mgr. for Nekoosa-Edwards

Charles M. Sigvardt, mgr. of the Nekoosa, Wis. mill since 1953, has been named mgr. of manufacturing operations for the Wisconsin mills of Nekoosa-Edwards Paper Co. He succeeds the late Cecil Parvin. Mr. Sigvardt joined Nepco in 1951 as technical supt. at Nekoosa. He has a phd. from the Institute of Paper Chemistry and at one time was paper mill supt. for Scott Paper Co.

F. Steindorf, mgr. of the Conveyor & Process Equipment div., becomes director of research and development. He has been with the company since 1924 and has been div. mgr. since 1948. In another Chain Belt appointment, William Sivyer, central regional sales mgr. of the company's Industrial section since 1957, succeeds Mr. Steindorf as mgr. of the Conveyor & Process Equipment div. He joined the firm in 1945 and became mgr. of the Philadelphia office in 1947. And Wyatt W. Dawson Jr., presently southern regional sales mgr. with an office in Los Angeles, moves to Milwaukee to become central and southern regional mgr.

Dr. James W. Evans, director of the Hammond, Ind. research laboratories of American Maize-Products Co., has been elected vice pres. in charge of research. —Don W. Zeigler.

Hasset Named Nekoosa Kraft Mill Supt.

Patrick J. Hassett becomes supt. of the Nekoosa, Wis. kraft mill of Nekoosa-Edwards Paper Co. He had been asst. supt. since August 1958 and prior to that was asst. to the supt.

Mr. Hassett, a chemical engineering graduate of the Univ. of Wisconsin, served as a technologist with Wood Conversion Co., Cloquet, Minn., for three years before joining Nepco's technical staff in 1953.

Hixon and Wright Appointed to Chilpaco Technical Posts

The appointment of Harold T. Hixon as technical director and of Charles J. Wright as quality control director is announced by Chillicothe Paper Co., Chillicothe, O. The positions are new ones.

Mr. Hixon comes to the wholly-owned subsidiary of the Mead Corp. from the parent firm's Chillicothe div., where since 1952 he served as technical service engineer. He joined Mead in 1940 as a control lab technician. Mr. Wright is being promoted from the Chilpaco lab. He joined the company in 1931.

Mesrobian Takes New Post at Continental Can

Dr. R. B. Mesrobian, formerly assoc. director of high polymer chemistry at the Central Research & Engineering div., has been appointed gen. mgr. of paper and plastic container research and development for Continental Can Co. His work now includes research on new and improved packaging machinery.

Prior to joining Continental Can in 1956, Dr. Mesrobian was assoc. director of the Polymer Research Institute at Brooklyn Polytechnic Institute.

Paper and plastic container research and development will be housed in a new laboratory to be constructed in Chicago as an addition to the company's technical center in that city.

South

Arthur F. Perkins, asst. mill mgr. at International Paper Co.'s Mobile, Ala. mill since 1955, becomes mill mgr. He began his career with IP in 1935 at Panama City, Fla., was formerly construction engineer at the Georgetown div. His predecessor, J. A. Lyden, mill mgr. since 1955, is now on special assignment in the div. manuacturing offices. . . . Malcolm B. Pineo, formerly technical director at Brunswick Pulp & Paper Co. and recently promoted to be a special asst. to Scott Paper Co.'s gen. mgr. G. K. Singletary, has been named production mgr. of Scott's Holingsworth & Whitney div. in Mobile. Mr. Pineo joined Scott in 1933 after graduation from the University of Maine. He later did graduate work at the Institute of Paper Chemistry, Appleton, Wis.

Kurt Wassen has become commercial supt. of West Virginia Pulp & Paper Co.'s bleached board div. at Covington, Va. . . . Hall B. Whitworth, formerly purchasing agent for Champion Paper & Fibre Co. at Canton, N.C., has been named mgr. of the newly established materials dept. at the North Carolina mill. He is now in charge of purchasing, traffic, receiving and storage, shipping and materials handling. . . . Babock & Wilcox Co.'s Tubular Products div. in Atlanta, Ga., has moved to 805 Peachtree St. Atlanta, 8, Room 464. . . . J. D. Wethern, graduate

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of the Univ. of Wisconsin and the Institute of Paper Chemistry, has been named technical director of Riegel Paper Corp's Carolina div. at Acme, N.C. . . . ROBERT C. KANY, Purdue Univ. graduate, is now Pennsalt Chemical Corp.'s representative in Florida. His home is at Winter Park.

The Brown Instrument div. of Minneapolis-Honeywell Regulator Co. has announced the appointment of ROBERT D. CLARKE as its market mgr. for the paper and textile industries. He joined the Mobile, Ala. office of Honeywell as a sales engineer in 1951 and has been district mgr. of the Columbia, S.C. office since 1954. . . . The board of directors of Lufkin Memorial Hospital in Lufkin, Texas, has announced that its new X-ray and cobalt radiation wing will be named for E. L. KURTH, president of Southland Paper Mills Inc. Mr. Kurth has been president of the hospital since it was opened in 1948. . . . EDISON M. UHLS has been named southwest district mgr. of the Disston div. of H. K. Porter Co. Inc. His territory includes Texas, Oklahoma, Missouri, Kansas, Arkansas, Nebraska, Colorado and southern Iowa. He was previously with the former Quaker Rubber div. of H. K. Porter, now part of the Thermoid div., where he served as district mgr. of the southwestern territory. . . . HOMER LAKE, who served Gilman Paper Co. in an executive sales capacity for many years before his retirement in 1957, died recently at his Virginia home.—William F. Diehl.

Sutherlands Tour Europe

D. MANSON SUTHERLAND, president of Sutherland International Ltd., designer and builder of pulp and paper processing machinery., P.O. Box 1124, Nassau, Bahamas, and Mrs. Sutherland will arrive in London, England on May 11 to call on customers and friends. They will stay at the Dorchester Hotel, Park Lane. They also are planning a trip on the Continent and a visit to Finland to inspect the Sutherland operations there. Sutherland International products include refiners, pressure washers, breaker traps, etc.

Northeast

JOHN H. HEUER has been elected vice pres. in charge of manufacturing for Great Northern Paper Co., Bangor, Maine. He was formerly mgr. of manufacturing. . . . RALPH H. MARTIN has been named asst. to the president of Standard Packaging Corp. He will concern himself with Stanpac's metallized paper operation. Mr.

Perkins-Goodwin Co. Names Louis Calder Jr. President

A native of New York, N.Y., and a graduate of Princeton Univ., Mr. Calder served during World War II as a pilot for the Marine Corps in the Pacific. He joined Perkins-Goodwin in pulp and paper sales in 1948. Louis Calder Sr., who recently celebrated his 80th birthday, is now chairman of the board.

IF You Ever Installed a Felt... You Know the Value of This Card!

Two years ago Lockport Felt Company originated this innovation, and began to ship these cards with every Tenax and Dura-Loft Felt. Papermakers everywhere tell us the "black edge" helps reduce "down time", eliminates guesswork.

Progress comes in small packages too!

Dura-Loft Felt

LOCKPORT FELT COMPANY, Inc.

Serving the Papermakers Since 1891

NEWFANE, N. Y. STARKVILLE, MISS.

TENAX FELTS

Martin is a graduate of Carnegie Institute of Technology, with a phd. in chemical engineering. . . . E. F. DEMLEIN has been appointed asst. gen. traffic mgr. of International Paper Co. He joined the firm's traffic dept. in 1946 and is a graduate of New York Univ. Named traffic mgr. for the Northern div. of International Paper is F. L. SPINNELL, who has been associated with the company since 1926. JOHN BATTEL has been named asst. traffic mgr. of operations.

Lindsay Wire Weaving Co. has reported that ROBERT HOWARD has now added New York State to his responsibilities in calling on mills in the Northeast, and he now serves New York, Pennsylvania and New Jersey. . . . NORMAN GORT has been appointed director of publicity for the Glassine & Greaseproof Manufacturers Assn. Mr. Gort was formerly head of the public relations dept. on the Liggett & Myers Tobacco Co. account at Cunningham & Walsh Inc. . . . HOWARD E. PIKE, 49, gen. traffic mgr. for Lily-Tulip Cup Corp., New York, N. Y., died in February after a long illness. He had been with the firm 25 years. . . . K. M. PATTERSON has been named to a newly created position as mgr. of headquarters sales depts. for Westinghouse Electric Corp.'s Apparatus div. in East Pittsburgh, Pa. Succeeding Mr. Patterson as mgr. of the div.'s industrial sales dept. is C. E. HAMMOND, formerly asst. mgr. for the South Pacific district in Los Angeles. Mr. Patterson joined Westinghouse in 1923 and served as salesman before becoming mgr. of the large motor sales section in East Pittsburgh in 1936. In 1949 he was named mgr. of the steel mill section of the industrial sales dept. and then served as mgr. of the latter dept. from 1952 until receiving his present assignment.

DELBERT J. MORRISON has been appointed director of planning for Oxford Paper Co. This is a new position that emphasizes the importance being given to forward planning. Mr. Morrison has been exec. sec. of Oxford's long-range planning committee since 1955 and will continue

O. W. Callighan Fills New Post at Minerals & Chemicals

MR. CALLIGHAN has been named director of customer relations for Minerals & Chemicals Corp. of America, Menlo Park, N. J.

Following study in pulp and paper technology at the University of Maine and the Institute of Industrial Arts at Gardenville, Que., Mr. Callighan joined the sales staff of Edgar Bros. Co.—subsequently Minerals & Chemicals—in 1927. He also spent three years as a chemist with Allied Paper Mills, Kalamazoo, Mich.

A pioneer in the introduction of American clays for paper coating, Mr. Callighan has been closely associated with the paper industry many years. He helped organize TAPPI's Kalamazoo Valley section, is a past chairman of the Michigan div. of the Superintendents Assn. and served as national chairman of the APPMSA Industrial Affiliates Committee. At one time a member of the exec. committee of national TAPPI, Mr. Callighan is presently serving as a member of the advisory committee on paper technology at Western Michigan Univ.

Putnam Becomes Impco VP

NEIL F. PUTNAM, since 1956 mgr. of engineering for Improved Machinery Inc., has been named vice pres. in charge of engineering. He is a 1934 graduate of M. I. T.

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in that capacity. He will continue to be located in Rumford, Maine. . . . HAROLD T. RAPPE has been elected treasurer and director of finance for Sealright-Oswego Falls Corp. He was formerly comptroller for American Seal-Kap Corp. . . . THOMAS B. HAIRE has been named manufacturing engineer for the Fibre Drum & Corrugated Box div. of Continental Can Co. He was formerly a plant engineer with Container Corp. of America and in his new position will assist all corrugated plants in resolving engineering problems that arise in connection with manufacturing equipment.

JAMES ERICKSON has been promoted to the position of sales coordinator at the Potsdam, N. Y. mill of Nekoosa-Edwards Paper Co. He has been with the company since 1950, handling various assignments in the sales order dept. in Port Edwards, Wis. . . . JOHN GRADO JR., has been named vice pres. and member of the board of directors of Fitchburg Paper Co., Fitchburg, Mass. He is vice pres. of Decotone Central Corp., Cleveland, O. Decotone is a subsidiary of Fitchburg.

Roots-Connersville Blower div. of Dresser Industries Inc. has announced the appointment of W. L. NOPPER as district mgr. of the New York office. He was formerly Philadelphia district mgr. for R-C. Succeeding him at Philadelphia is R. G. NANCARROW. For the past five years he has been a field engineer in the company's Chicago office.

DEANE A. ANDERSON has been appointed representative for the Stanley Steel Strapping div. of Stanley Works, New Britain, Conn. He will cover Pennsylvania, Delaware and New Jersey and will headquarter in Philadelphia. He was previously representative for the Ayer Associates div. of Electronic Communications Inc. . . . EDWARD J. GEISE has been named mgr. of commodities sales for the Naugatuck Chemical div. of United States Rubber Co. He was formerly asst. mgr. of commodities sales and replaces ALBERT W. HOLMBERG, who retired in February after 50 years of service in the rubber industry.—Maurice R. Castagne.

Brown Co. Appoints Presidential Assistant

CONRAD T. WALDIE has been named technical asst. to the president of Brown Co., Berlin, N. H. In addition to daily liaison between production and sales, his duties will include the appraisal and evaluation of reports relative to operations, research and development.

Mr. Waldie has been with Brown Co. since 1952 and served in various capacities prior to becoming asst. to President A. E. H. FAIR. For a time he supervised Nibroc towel production and more recently was asst. to the technical director, DR. GEORGE A. DAY.

Nicholas Bachynski, Chas. T. Main

Mr. Bachynski, of Lyndhurst, O., has joined the Pulp and Paper Group of Chas. T. Main, Inc., as member of the engineering staff. Prior to this affiliation, he was with Reliance Electric and Engineering Co. After graduating from the University of Manitoba in 1947 (B.Sc. EE), he worked as paper mill control engineer for the Abitibi Power and Paper Co. and in the frequency conversion division, Canadian Comstock Co. He holds a masters degree from Harvard Graduate School of Business Administration.

Charles J. Sibler, Chief Engineer West Va. Pulp and Paper, Dies

Charles J. Sibler, chief engineer of West Virginia Pulp and Paper Co., died of a heart attack Mar. 12 at his home in New York City. He was 62 years old. He was born and educated in Zurich, Switzerland and came to U.S.A. in 1920 after graduating from Swiss Federal Polytechnic Institute.

He had been with West Virginia for 22 years and its chief engineer since 1942.

An authority on steam and power, Mr. Sibler directed the engineering of the company's $200,000,000 post-war expansion which increased production from 500,000 to more than 1,000,000 tons per year. He introduced advanced techniques in power, process, recovery, and waste treatment. He was a former executive committeeman and chairman of TAPPI's Engineering Division. A son in New York and three brothers and three sisters in Switzerland survive.

Boylon ..... Dupuis

Honored for Service at CZ

F. O. Boylon, res. mgr. of Crown Zellerbach Corp.'s Camas, Wash. div., accepts service pin recognizing his 10 years with the firm. Presenting the award is R. A. Dupuis, res. mgr. of the St. Helens, Ore. plant.

Pacific

Ken Roberts, formerly of Weyerhaeuser Timber Co.'s Pulp div. at Longview, Wash., has been named paper mill supt. for Oregon Pulp & Paper Co., Salem. . . . L. O. Reisinger, personnel mgr. for St. Regis Paper Co., Tacoma, has marked his 30th year with the firm. . . . Richard Urquhart, Crown Zellerbach at Portland, has been named chief logging accountant, Northwest timber. . . . Wyman Hicks of Crown Zellerbach at San Francisco moves up from research associate for market research to product planning coordinator. . . . Forest Berry, formerly power plant shift engineer for Ketchikan Pulp Co., has joined Alaska Lumber & Pulp Co. at Sitka as power supt. . . . Don Moore has been named power plant shift engineer at Ketchikan Pulp. . . . Ivan Biehl succeeds Loran Hunter as shift foreman at Ketch-

ikan Pulp when the latter joins the engineering dept. of Alaska Lumber & Pulp, Sitka.

The Western-Waxide div. of Crown Zellerbach Corp. has promoted CECIL DILLING from asst. gen. mgr. for production to asst. to the vice pres. at the San Leandro, Cal. headquarters. MOSS BARR becomes asst. gen. mgr. of production at San Leandro. He was formerly resident mgr. of the North Portland, Ore. plant. Succeeding him at North Portland is ROBERT RANT, former asst. resident mgr. JOHN NEWLAND becomes quality control supervisor at San Leandro. . . . STANLEY ARNOLD, formerly development chemical engineer at the Crown Zellerbach Camas, Wash. mill, is named quality control supervisor at the Western-Waxide plant in Los Angeles.

DONALD POULSON, formerly on the staff of the Port Angeles, Wash, mill of Rayonier Inc., becomes senior engineer at the Port Townsend (Wash.) div. of Crown Zellerbach. . . . J. E. BURNESS, gen. mgr. of Container Corp. of America's Seattle operations, temporarily takes on additional duties as Portland gen. mgr. when DAVID F. REYNOLDS leaves to become gen. mgr. at the Rock Island, Ill. plant. . . . CONRAD SPEIDEL, public relations dept., Crown Zellerbach, San Francisco, moves from publications and graphic services mgr. to information services mgr.

Erik T. Ekholm, Puget Director

Mr. Ekholm, vice president of Puget Sound Pulp & Timber Co., has been elected director to complete the unexpired term of J. J. HERB, founder of Pacific Coast Paper Mills, now merged with Puget Pulp, who died Mar. 1, 1959. Mr. Ekholm joined Puget Pulp in 1927 as mill supt., later served as general supt., and since 1950 has been vice pres. in charge of operations. He holds a similar position in Ketchikan Pulp Co.

PAUL V. BROWN has been appointed mgr. for manufacturing of the La Verne, Cal. plant of Taylor Fibre Co., Norristown, Pa. Prior to joining Taylor Fibre, he was technical director of Fabricon Products, Los Angeles. . . . HAROLD C. HANSEN has been named mgr. of the San Francisco office of Allied Chemical Corp.'s General Chemical div. He succeeds WILLIAM L. HOEFLING, who recently retired after more than 33 years with the company. Mr. Hansen joined General Chemicals at the Seattle office in 1950 as technical service specialist. In 1955 he became mgr. of the Denver, Colo. office and returned to Seattle as mgr. in 1957.

RICHARD T. COTTER, 49, office mgr. of the traffic dept. at Crown Zellerbach Corp.'s San Francisco headquarters, died of a heart attack early in February. He had been with the firm since 1927. . . . GEORGE E. AUSTIN, sales engineer in Spokane, Wash., since 1951, has been appointed Spokane district mgr. for Link-Belt Co. He succeeds HOMER A. GARLAND, who for reasons of health has relinquished these duties. Mr. Garland continues as supervisor of the Spokane factory branch store.

RAYMOND L. HOWERTON has been named sales mgr. for Cascade Mfg. Co. and will be responsible for all company marketing activities, including sales, advertising, promotion, service and parts. . . . BEN KIRBY, director of engineering and development for Electric Steel Foundry Co., was keynote speaker at the recent Western Metals Congress in Los Angeles. . . . D. C. ELLSWORTH, vice pres. of Oregon Pulp & Paper Co., officially inaugurated construction of the firm's new office building in Portland recently.—Louis H. Blackerby.

Dr. David S. Most, Tech. Service Supt., Halifax Paper Co.

Born in Boston, graduate cum laude of Boston U. with ph. d. from The Institute of Paper Chemistry, he was research and group leader, tech. div., Albemarle Paper Mfg. Co. Prior to that he was with National Container in Wisconsin and Fibreboard in California. He succeeded the late JOHN J. PRIEST at Halifax, Roanoke Rapids, N.C.

Canada

C. E. ALLAN is new plant mgr. at Canada Paper Co., Windsor Mills, Que. He succeeds S. HALL, who has retired after 30 years' service. Mr. Allan joined the company, a subsidiary of Howard Smith Paper Mills Ltd., in 1938. During the war he was with the National Research Council but returned to Howard Smith in 1945. . . . . NEIL MCLEAN has been named gen. purchasing agent for Columbia Cellulose Co. Ltd. and Celgar Ltd., Vancouver, B.C. He succeeds T. C. SPANGLER, who has been transferred to Fiber Industries Inc. Mr. McLean joined Columbia Cellulose in 1951 as buyer-expediter for construction when the mill at Prince Rupert, B.C., was being built. He moved to the Vancouver head office as purchasing agent for Columbia Cellulose in 1957. . . . ROBERT E. NOBLE, works mgr. for Hooker Chemicals Ltd. since the plant was built in Vancouver, B.C., in 1957, has been named asst. gen. mgr. for the Phosphorus div. and is moving from Canada's west coast to Jeffersonville, Ind. Succeeding Mr. Noble is LESLIE H. SCHNURSTEIN, who has also been with the B.C. plant since its inception. He was previously production supt.

M. J. FOLEY, president of Powell River Co. Ltd., has been elected president of the British Columbia and Yukon Council of the Boy Scouts Assn. A Vancouver newspaper had this to say about Mr. Foley's election: "It shouldn't be too hard for the former Notre Dame quarterback, who since coming to this province in 1948 has made himself as much at home in the B.C. woods as Smoky the Bear." Mr. Foley is a native of Louisiana. . . . CHARLES A. NEWMAN has been named vice pres. of Quebec North Shore Paper Co., Baie Comeau, Quebec. He succeeds G. J. LANE, who retired effective Jan. 1. Mr. Newman joined Quebec North Shore Paper in 1937 and since 1956 has been

Strictly Personal

div. mgr. . . . JOHN R. MCGRATH has been named traffic mgr. for Howard Smith Paper Mills Ltd. and subsidiary companies. He joined the firm in 1947.

PAUL BERNARD has been named gen. mgr. of the Carton Specialty div. of Hinde & Dauch Paper Co. of Canada Ltd. He was previously director of sales development. . . . DOUGLAS HOLME has been appointed traffic and customer service director for Westminster Paper Co. Ltd. He was previously company traffic mgr. at New Westminster B.C.—Charles L. Shaw.

Hinman Appointed Gen Mgr., Canadian International

E. B. HINMAN, vice pres. of Canadian International Paper Co., has been named gen. mgr. of the firm, and W. T. BENNETT, chief engineer since 1950, becomes vice pres. in charge of engineering.

In his new position, Mr. Hinman named F. J. GIFFEN mgr. of manufacturing. He was formerly pulp div. mgr.

Mr. Hinman joined Canadian International in 1936 at the Gatineau, Que. mill. In 1947 he became paper mill supt. of New Brunswick International Paper Co. at Dalhousie, N. B. Three years later he became gen. supt. at Trois Rivières, returning to Dalhousie in 1952 as mill mgr. In 1953 Mr. Hinman moved to the Montreal offices as mgr. of newsprint mills, becoming vice pres. in 1956.

Christian Retires at Bathurst Power & Paper

The retirement of R. H. CHRISTIAN from the office of exec. vice pres. has been announced by Bathurst Power & Paper Co. Ltd. The action was taken at Mr. Christian's request. He has been a director of the firm since 1954 and will continue to serve in that capacity.

Progress on Printability Research is Reported

Pick testing research conducted under a TAPPI grant at Lehigh University and elsewhere is progressing. The objective is to recommend a TAPPI standard method for evaluating the surface strength of paper and paperboard. During the first year, 11 pick testers were studied at Lehigh and/or at various laboratories where they exist. A major problem uncovered was lack of reproducibility from day to day as well as from instrument to instrument. Further work must be directed to elucidating the causes for the variability so that the sources may be eliminated. The cooperation of almost 40 paper companies and other industrial and research organizations is evidence of the widespread interest.

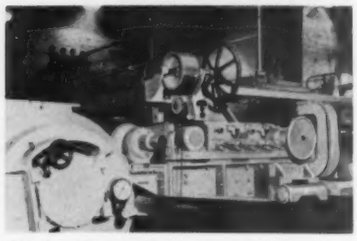
A TAPPI research grant also provides for studies of surface characteristics of paper and paperboard as related to printing smoothness at The Institute of Paper Chemistry, Appleton, Wis. A nip-spreading technique for obtaining a roughness index was applied to eight widely different samples. The roughness index, proof press printability, Chapman smoothness, gloss, surface, contour, and formation tests were compared and interrelated.

PULP & PAPER

New Equipment Section

High-Speed Suction Unit

. . . Wire Life Doubled



Applications: For extracting water during the formation of paper, particularly on fast and/or wide newsprint and kraft machines.

Advantages: The Evans Rotabelt is a high-speed unit that has a special metallic-reinforced belt. Following development and trials in cooperation with Bowaters' United Kingdom Pulp & Paper Mills Ltd., the manufacturer has made the following claims: That (1) wire life is considerably increased; (2) couch power can be substantially reduced; (3) production can be increased since the Rotabelt can be operated at higher vacuums than is conventionally possible; (4) the number of wet breaks is reduced; (5) formation is improved; (6) planned shut-downs can be made for week-end wire changes, and (7) the Rotabelt can be built for all widths and speeds.

Supplier: **W. P. Evans & Son Ltd., Milford Rd., Nashua, N. H., U. S. A.; and Clifton, Manchester, England, Tel: SWinton 3036.**

Indicating Temperature Controller

. . . No Electronic Tubes

Applications: To monitor temperatures of large motor bearings and windings, other electrical equipment and materials in process.

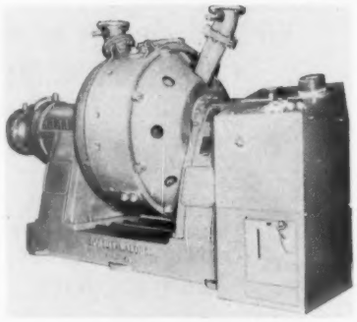
Advantages: The Limitemp combines magnetic amplifier and transistor circuitry and is said to monitor and control temperatures within the range of 100° to 400°F. with "extreme reliability." Models for higher temperature ranges are to be available soon. Accuracy for temperature control is ±3°F. about the level selected; accuracy for indication by meter reading is ±6°F. An integral indicating lamp signals whenever the controller is functioning to restore temperature to the level desired.

Specifications: Power output of the device is 5 watts at 24 volts d. c. It senses temperature through standard copper temperature detectors having a resistance of 10 ohms at 25°C. Rated power input is 115 volts at 60 cycles. Approximate dimensions: height—8½ in.; width—4 in.; depth—6 in.

Supplier: **Westinghouse Electric Corp., Director Systems Dept., 356 Collins Ave., Pittsburgh 6 Pa., U.S.A., Tel: EXpress 1-2800; and Westinghouse Electric International Co., 40 Wall St., New York, N. Y., U. S. A.**

Pressurized Refiner

. . . Maintenance Simplified



Applications: For stock preparation.

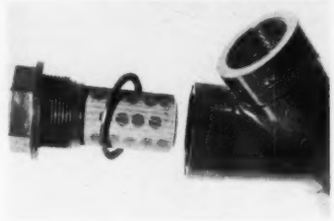
Advantages: The unit has a twin flow feed arrangement and self-balancing thrust and uses standard motors. According to Sprout, Waldron, the unique design eliminates heavy thrust bearings and requires only simple radial ball bearings. The motor is mounted independently; the casing is designed to permit a number of different discharge positions and a variety of flow arrangements; simple hydraulic controls may be operated manually at the refiner or remotely from the paper machine; the design provides a minimum of friction losses with motors of up to 1200 hp.

Specifications: A floating rotor shaft assembly rotates between a fixed and movable head. A set of refining plates is mounted on each face of the rotor as well as on two stationary heads. Pressure between the refining plates is controlled hydraulically. The refining surface is equal to twice that of a standard single-disc refiner. Pulp enters from two separate intake pipes but passes out through a common discharge. Pressure-equalizing ports are provided in the rotor. Corrosion-resistant construction (unless otherwise specified) is used for all metal parts in contact with the pulp.

Supplier: **Sprout, Waldron & Co. Inc., 130 Logan St., Muncy, Pa., U. S. A., Tel: 6-3111; and Leje & Thurne AB, Stockholm 16, Sweden.**

PVC Plastic Strainers

. . . Marketed World-Wide



Applications: For trapping particles that would be hazardous to the internal moving parts of process equipment.

Advantages: This complete line of PVC plastic strainers—now being marketed by a world-wide sales organization—boasts polyvinyl chloride construction of housing, strainer and gasket. The unit's light weight permits its installation directly on delicate equipment. The strainer element is readily accessible for cleaning or replacement.

Specifications: Sizes range from ⅛ in. through 2 in. with either socket weld ends for solvent weld connections or molded thread ends.

Supplier: **Vanton Pump & Equipment Corp. (div. of Cooper Alloy Corp.), Hillside, N. J., U. S. A., Tel: WAverly 6-2435.**

Lift Truck

. . . Pneumatic-Tired

Applications: Suited specifically for work in confined quarters.

Advantages: The 2,000-lb. capacity FTP 20-24 has an outside turning radius of 70 in. and center-point steering that permits turning in a minimum radius in either direction.

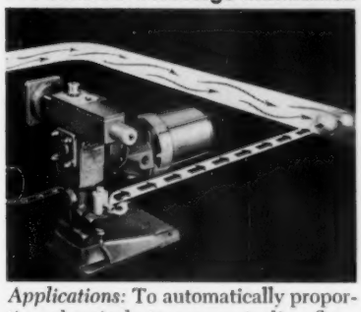
Specifications: The model is powered by a four-cylinder heavy-duty industrial engine available in either gasoline or LP fuel models. Both deliver 35

brake hp. at 2400 rpm. A two-speed constant-mesh transmission is standard equipment. Optional is the Power-Shift torque converter drive. Maximum stacking height is 131¼ in.; over-all lowered height 83 in.; free lift 16¾ in. Over-all width is 36½ in.

Supplier: **Allis-Chalmers Mfg. Co., 1126 S. 70th St., Milwaukee 1, Wis., U. S. A., Tel: SPring 4-3600; and Allis-Chalmers International, Engineering Products, P. O. Box 512, Milwaukee 1.**

Automatic Metering Pump

. . . Constant Discharge Maintained



Applications: To automatically proportion chemicals to any main line flow.

Advantages: Utilizing its pneumatic stroke-controlled instrumentation, this latest addition to the McCannameter line maintains a constant discharge in proportion to the main line flow (see illustration).

Specifications: Operating on a 3- to 15-psig air signal, the instrument requires no additional power source of air, responds instantaneously to eliminate backflash and to keep the chemical discharge-to-flow ratio precisely accurate.

Supplier: **Hills-McCanna Co., 4600 W. Touhy Ave., Chicago 46, Ill., Tel: COrnelia 7-5900.**

Worm Gear Speed Reducer

. . . Horsepower Cost Reduced

Applications: For speed reduction on a variety of mechanical units.

Advantages: The universal worm gear unit can be mounted in three positions: worm shaft below gear, worm shaft above gear and output shaft vertical. According to the manufacturer, cost of horsepower has been reduced through use of a one-piece cast iron housing with external fins for cooling and an aluminum radial fan that directs air over the fins.

Specifications: The units are available in 2½-, 3-, 3½- and 4-in. centers with up to 13½-hp. input rating and 7,240-lb. in output torque rating.

Supplier: **Link-Belt Co., Dept. PR, Prudential Plaza, Chicago 1, Ill., U. S. A., RAndolph 6-7790.**

Expanding Core Shaft

. . . Supports Heavy Stock Rolls

Applications: For engaging cores in winding and unwinding operations.

Advantages: No moving mechanical parts are employed, and all parts are easily removable for service.

Specifications: The Fairchild unit utilizes a heavy rubber tube secured to a hollow core shaft and is capable of supporting heavy stock rolls. The rubber tube is encased in a perforated steel sleeve that is mounted to the core shaft. When expanded by air pressure, the rubber "bubbles" grip the core securely.

Supplier: **Black-Clawson Co., Dilts Div., Fulton, N. Y., U. S. A.; and Black-Clawson International Ltd., 18 Savile Row, London W. 1, England.**

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One "Youth Gang" we need more of...

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20 million of our sons and daughters make up Junior Red Cross—the largest youth organization in the country. Junior members take part in every one of the Red Cross service programs that young people can help to carry on.

When disasters hit, Junior Red Cross volunteers help in many ways—as messengers, typists, canteen workers, information clerks. Many Junior Red Cross members have served with real distinction in disaster emergencies.

Through the Gift Box Program in their schools, Juniors send relief supplies to children overseas. Like all Junior Red Cross activities, this program is financed entirely by the Juniors themselves.

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Junior Red Cross is at work every day, helping to build a strong, decent, responsible young America.

These are kids we don't have to worry about. Let's be sure they know they can depend on *us.*

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Job requirements include giving technical service to the various operating divisions, preparation of flow diagrams and plant layouts, writing of specifications, accomplishment of basic engineering relating to size, capacity and arrangement and coordination of effort between engineering department, operating division and outside vendors.

Travel will be required to the extent of job requirement.

Salary open and commensurate with experience.

The satisfactory fulfillment of this position requires both the thinking and *doing* phases of a job. Self reliance is a necessary attribute.

Those interested should contact Mr. A. L. Noble, West Virginia Pulp and Paper Co., 230 Park Avenue, New York 17, New York, Room 527, for interview. Telephone MU 6-8400.

ATTENTION RETIRED ENGINEERS

We require the part-time services of a former Senior Engineer in the Dissolving Pulp Field as Plant Layout Consultant. Particulars to Box P-132, PULP & PAPER, 370 Lexington Ave., New York 17, N. Y.

WANTED

Experienced coating and color man with technical background for a bleached kraft food board mill. Excellent opportunities, salary and benefits. Please send resume including education, experience and salary requirements. Write Personnel Manager, American Box Board Co., Filer City, Michigan.

FOR SALE

ROTARY KILNS: 11′ x 155′, 8′ x 126′, 8′ x 125′, 8′ x 115′, 8′ x 50′, 7′ 6″ x 100′, 6′ x 60′, 4′ x 24′. STAINLESS STEEL TANKS: 10,500, 5,700, 5,200, 4,500, 3,000, 2,000, 1,000 gal., new and used. PERRY EQUIPMENT CORP., 1403 6th St., Phila. 22, Pa.

PULP MILL PERSONNEL required for

New dissolving pulp mill located at Sitka, Alaska (Sitka is located in southeastern Alaska—Moderate Climate —96″ annual rainfall.)

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Must have previous experience in organization and operation of pulp mill store room.

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Requires at least 5 years previous experience in pulp mill as lead maintenance electrician.

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Applications will be received for above position in a modern sulphite dissolving pulp mill which will use MgO process with a continuous bleach plant and Minton Dryer.

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Requires dissolving pulp background and preferably with MgO experience.

The above positions will provide adequate salaries, liberal group insurance benefits, above average security and the opportunity for progress. Applications should be submitted in writing to:

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Alaska Lumber & Pulp Co., Inc.
311 American Building
Seattle 4, Washington

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Complete responsibility for operation of branch plant, located North-Central states. Paper operation affiliated with large consumer goods manufacturer, home offices in Mid-Atlantic states. Proven leadership ability. Minimum ten years process (paper preferable) experience—five in direct supervision. Degree in Mechanical or Chemical Engineering or Chemistry. Send detailed resume to Box P-136, PULP & PAPER, 370 Lexington Ave., New York 17, N.Y.

WANTED

Quality Control Supervisor for expanding Multiwall paper bag plant. Excellent opportunity for Multiwall bag man. Reply in confidence to Personnel Dept., Ames Harris Neville Co., 8th & Parker, Berkeley, California.

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One Eaton debarker with extra head. Excellent condition. Warren type 4K-12 pump used as high pressure water pump, also available. Can be inspected. Reply Box P-119, PULP & PAPER, 370 Lexington Ave., New York 17, N. Y.

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PULP & PAPER ADVERTISERS' INDEX

The Last Word — PULP & PAPER — Editors' Page

Threatening Southern Stability

Cotton is no longer king in the Deep South. In recent decades the crown has passed to the thousands of small forest fires or beetles but by a New England senator who economy from the Rio Grande to Cape Hatteras.

Now this newly-won supremacy is threatened not by forest fires or beetles but by a New England senator who would amend the Fair Labor Standards Act. Comparatively insignificant on the national scene, Sen. John F. Kennedy's (D, Mass.) suggested changes in the act could well spell ruin for the small producers, farmers and other part-time woods operators on whose shoulders rests the economic future of the South's gigantic wood-using industries.

On the one hand, Sen. Kennedy would increase the minimum hourly wage from $1.00 to $1.25. This alone could easily place the South in an unfavorable competitive position with other wood-producing regions. The result: unemployment and serious business losses.

This is not enough for the New Englander. He would also eliminate the so-called 12-man exemption that now relieves the small employer from the record-keeping provisions of the Wage & Hour Act. This would open vast opportunities for "hot goods" injunctions brought by government investigators. A buyer of pulpwood, for example, would be forced to determine that all his wood had been cut in compliance with Wages & Hours provisions. For if it weren't, the government could legally slap an injunction on every stick of wood in the yard. A 10-cord shipment "cut illegally" could conceivably tie up thousands upon thousands of legal cords and hence virtually close down the mill.

The South has made tremendous strides in pulp and paper and timber production in a relatively short period of time. It will depend on a handful of men in Washington whether this progress is seriously hampered—or even halted altogether.

Addis Ababa to Zagreb

Inflation is still a serious threat to the strength and vitality of a free American economy. Its ravages are world-wide and have been felt by commerce and industry in every corner of the globe.

Especially interested in combatting the dangers of the inflationary spiral is the United States trade press, which has earned its freedom by demonstrating its responsibility in pointing the way to sound economic policy. This was never more vital than it is today, and such organizations as Associated Business Publications (PULP & PAPER is a member) have taken a close look at the place of the business paper in the United States economy and especially in relation to this inflationary menace.

A basic interest in economics is essential to the trade press. From the reputable business publication its readers learn the how's and when's and why's of business improvement. Its advertisers depend upon its acceptance by the leaders of industry, for without that acceptance the advertising message would fall on deaf ears.

As an active and—we hope—constructive member of ABP, PULP & PAPER has as its basic duty that of attacking business problems within the specific industry served. A horizontal effort would lose momentum in generalization.

In so doing we serve to enhance the stature of industry the world over, for American industrial and commercial techniques are constantly serving as the model for economic growth in other nations. Every successful effort to add to the vitality of American business sets the future pattern overseas.

Speaking recently at an ABP-sponsored meeting of business paper editors, Secretary of Commerce Lewis L. Strauss had this to say: "Your publications already are performing an extremely valuable public service by creating abroad a better understanding of our American free enterprise system and its products." Secretary Strauss takes pride in the fact that at international trade fairs—from Addis Ababa to Zagreb—the American trade magazine has become the center of attraction because of its duty to educate and to criticize whenever the need arises. We share that pride.

Pressure for Wilderness Bill

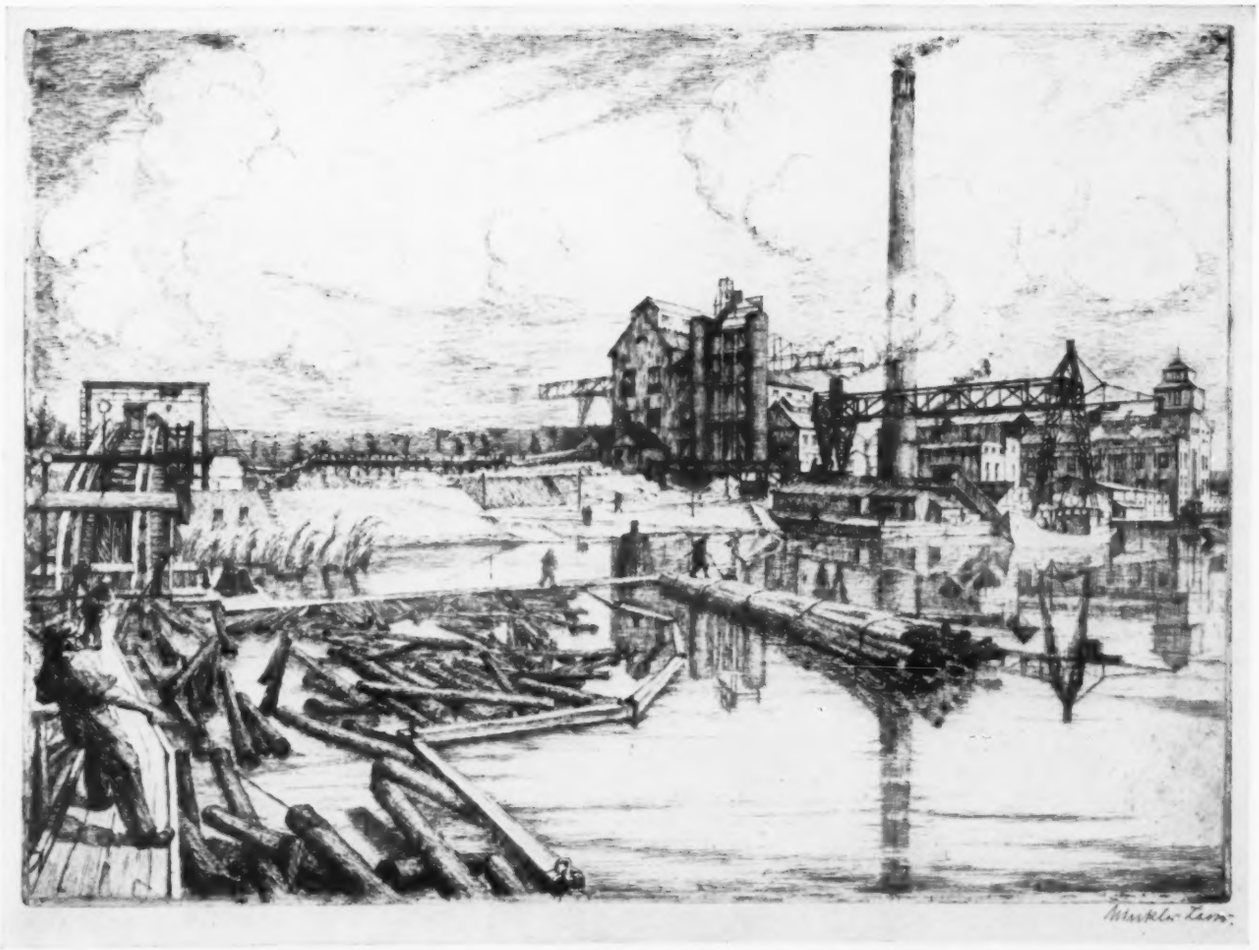
Look out for "new" version of the Wilderness Bill! It embraces "significant features" of last year's S. 4028. Members of Congress are reportedly being bombarded with unprecedented pressures for passage.

Here is what the Arizona Fish & Game Commission pointed out by letter to Sen. James E. Murray, chairman of the Senate committee and insular affairs, regarding the proposed legislation:

"Creation of a wilderness council creates another special interest group. Ultimately, the goal of all councils, advisory boards, etc., is to press responsible administrative agencies for consideration favorable to their special interest. All such groups should be eliminated and, in the public interest, a standing committee composed of two members representing each of the multiple uses (recreation, mining, timber, grazing, and water production) should be submitted."

It behooves this industry, which has so much at stake, to know all the facts in this legislative action which threatens to lock up valuable forest lands, in many cases where the forests would deteriorate if not used judiciously.

PROMINENT PAPER CONSUMERS. Paper boxed and wrapped the 42nd wedding anniversary present for President and Mrs. Dwight D. Eisenhower — except one, the kiss from his 9-year-old granddaughter, Barbara Anne.



"Log Harbor" Original etching by Paul Winkler-Leers from the Asten-Hill collection.

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